

# FLIGHT

*The*  
**AIRCRAFT  
ENGINEER  
&  
AIRSHIPS**

**First Aero Weekly in the World**

**Founder and Editor: STANLEY SPOONER**

**A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport**

**OFFICIAL ORGAN OF THE ROYAL AERO CLUB OF THE UNITED KINGDOM**

No. 573 (No. 51, Vol. XI.)

DECEMBER 18, 1919

[Weekly. Price 6d.  
Post Free, 7d.]

## Flight

*The Aircraft Engineer and Airships*

**Editorial Office: 36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.**

Telegrams: Truditur, Westcent, London. Telephone: Gerrard 1828.

Annual Subscription Rates, Post Free:

United Kingdom .. 28s. 2d. Abroad.. .. 33s. 6d.\*

These rates are subject to any alteration found necessary under abnormal conditions

\*European subscriptions must be remitted in British currency.

## CONTENTS

	PAGE
Editorial Comment	
The Pioneer Flight to Australia .. .. .	1605
Imperial Air Routes .. .. .	1606
Encourage Private Enterprise .. .. .	1606
The Future of the Royal Air Force .. .. .	1608
Training of Officers and Men .. .. .	1608
Research .. .. .	1610
Flight—and the Men: Mr. E. Boudot .. .. .	1607
The Paris Aero Show .. .. .	1611
The Crown of the Year. By Massac Buist .. .. .	1617
Personals .. .. .	1618
The Flight to Australia .. .. .	1619
The Air Estimates .. .. .	1621
The Permanent Royal Air Force .. .. .	1622
The Vickers-Vimy Presentation .. .. .	1628
Airisms from the Four Winds .. .. .	1629
The Bloc-Tube Carburettor .. .. .	1631
The Royal Air Force .. .. .	1632
In Parliament .. .. .	1633
Models .. .. .	1634
Side-Winds .. .. .	1636

## DIARY OF FORTHCOMING EVENTS.

*Club Secretaries and others desirous of announcing the date of important fixtures are invited to send particulars for inclusion in the following list:*

**Dec. 19 to ... Paris Aero Show.**

**Jan. 4, 1920.**

**April 18 to May 2 Seaplane Competition at Monaco**

**June 1 ... Air Ministry Competition (Small Type Aeroplanes), Martlesham Heath**

**July, 1920 S.B.A.C. International Aero Exhibition at Olympia**

**Aug. 1 ... Air Ministry Competition (Seaplanes) Felixstowe**

**Sept. 1 ... Air Ministry Competition (Large Type Aeroplanes), Martlesham Heath**

## EDITORIAL COMMENT



### The Pioneer Flight to Australia

HE seemingly impossible has been accomplished and the journey from England to Australia by a single aeroplane, with the same two engines with which it started, has been successfully completed in a time well within that stipulated by the Australian Government, in its offer of a prize of £10,000 for the pioneer flight, and easily better than the fastest steamer record.

To say that we congratulate the pilot, Capt. Ross-Smith, and his three intrepid companions in the flight, is merely to utter a commonplace—their achievement is one of those things which leaves the ordinary person spell-bound and incapable of adequately expressing his thoughts. Therefore, we must leave this side of the matter and pass on to consider other impressions on the bearing of the flight on the future of our commercial air routes. Nor have we the greater hesitation in doing this because by the time these lines appear in print the flight and its successful termination will be more than a week old and all that need be said of a congratulatory nature will have been enunciated.

We have said that the seemingly impossible has been achieved and that is perfectly true. It is doubtful if anyone was virtually sanguine of success in the attempts made and to be made by the six competing machines which have been entered for the flight round half the world. No one doubted that Australia could be reached by air, but, in the judgment of many, it could only be done by the use of several machines worked in relays. Nor does the success of Capt. Ross-Smith alter the fact that the commercial routes from England to the Antipodes which will undoubtedly be established in the near future will be worked in this way. Not only will this be necessary from the point of view of safety, efficiency, and the saving of time, but it is too much to ask of pilot and crew that they should undergo the tremendous strain, physical and nervous, that so prolonged a flight entails. What Capt. Ross-Smith and his companions have really done is to give the world the most striking demonstration we have yet had of the fact that the aeroplane with its engine is a practical vehicle, and neither a toy nor an instrument of warfare alone.

**NOTICE.**—Owing to Christmas Day and Boxing Day falling on Thursday and Friday, it is necessary that all copy, Editorial and Advertisement, for the issue of December 25 should reach **FLIGHT** Offices not later than the morning of December 19.

As an object lesson it dwarfs into insignificance even the flight across the Atlantic, although the latter was, in some respects, the more spectacular. It opens up new vistas of travel and brings us to the opening of a new era in which the peoples of the world will be drawn closer together by the new transport. In the days of the old navigators the world was unexplored and unknown, and their voyages were regarded by their contemporaries very much as the popular world regards the achievements of such pioneers as Capt. Ross-Smith. They could not foresee that these wonderful voyages were but the forerunners of similar journeys which would be commonplace in the years to come, or that these voyages which seemed—and were—heroic would one day be undertaken by millions as a part of the routine of life. The navigation of the seas then was in its infancy. To-day aviation is in the same stage of first youth and, as marine travel has developed since the days of Columbus and Vasco da Gama, so will aerial travel develop in the years to come. The one essential will be that, while it required centuries and the discovery of the steam engine to bring about revolution in travel by sea, the development of air transport is simply a matter of applying the knowledge and the material we already have at our disposal.

**Imperial Air Routes** From the successful accomplishment of the flight to Australia to the report of Lord Weir's Committee on Civil Aviation is an easy step. This Report, issued as a Parliamentary Paper, was published in **FLIGHT** last week, and its recommendations make interesting reading. Briefly, the Committee propose:—

- (1) That the air route from Egypt to India should be developed.
- (2) That the development should be by private enterprise backed by State assistance, and that the State assistance should take the form of providing meteorological and wireless services and of air ports, including the provision of the sheds required for running purposes.
- (3) That the service proposals for these air ports should be carried through as soon as possible.
- (4) That the necessity for additional expenditure on the development of these ports for purely civil purposes in order to meet the increase in frequency of the services should not be overlooked, though only experience can show what such expenditure may be.
- (5) That the G.P.O. in consultation with the Air Ministry, should draw up a form of tender for an air mail contract between Egypt and India to be put up for competition.
- (6) That a certain quantity of the aircraft engines and material which have been declared surplus by the Royal Air Force could be placed at the disposal of the Civil Aviation Department for distribution free in this country and the colonies.
- (7) That the prohibitory bans on civil aviation in Egypt and India should be removed.

These proposals are made on the assumption that the Government intends to maintain flying supremacy by supporting the Service side at a level which will ensure the safety of our position. It is not practicable, in the view of the Committee, to recommend any large appropriation of public funds by way of investment in an entirely novel business. They are, however, of opinion that, taking a long view, any investment such as they suggest will at least bring the necessary experience to help to establish flying ultimately on a paying basis.

The Committee seems to be exceedingly cautious in the elaboration of its recommendations. For instance, it lays down that the problems involved in each section of an Imperial route vary greatly and thereby render the formulation of a general

Government policy exceptionally difficult at present. Admitting all this, it would still seem that the basic consideration is whether or not it is considered essential to maintain aerial supremacy, commercial and military, or not. It has been generally agreed that the answer to this fundamental question is in the affirmative. That being so, surely the right policy is to take the bolder course and willingly go into the matter with the intent to create and maintain these routes even if the policy should involve a heavy initial loss. It need not be disguised that such a loss would be almost—even certainly—inevitable, as must be the case with all pioneer enterprises. But if we take the long view, it seems almost equally certain that, ultimately, these routes will pay handsomely and the true policy, therefore, is to undertake the commitment straight away, and before the possibility becomes elusive. The Committee themselves admit that private enterprise cannot inaugurate and maintain these routes unaided and that a measure of State support is essential. We would further emphasise the fact that time is also an essential factor. Private enterprise cannot fail to become weary of the long wait and it is very much to be feared that, unless the Government can very shortly make up its mind as to its real policy, when at long last it has reached a decision we shall have retrograded to a position something approaching that which existed before the War.

**Encourage Private Enterprise**

The vacillation and indecision of the Government in the matter of the Imperial air routes and aviation in general is the less understandable when we read that no less a sum than £12,000,000 has been saved on the current year's Estimates. We are all in favour of economy, but there is economy which is twin-brother to extravagance and we urge that economy, so-called, in the matter of encouraging the development of civil aviation is of that brand. Even the most hide-bound bureaucrat of them all realises and admits that, unless we are as powerful in the air as we are at sea, we are in grave danger of attack at the "chosen moment" of any aggressive Power who may envy our possessions. On Saturday last the new scheme for the re-organisation of the R.A.F. on a peace basis was published. From it we find that the total establishment of service squadrons for the United Kingdom is to be four, excluding five squadrons for the Navy and one flight per division for the Army. There is to be one airship station only, and the establishment of lighter-than-air craft is to be reduced to one rigid and two non-rigid airships. In addition, it is proposed to provide eight squadrons for India, three for Mesopotamia and seven for Egypt. Now, this is all very well as a nucleus and we shall not presume to say that the proposed new organisation is not sufficient for our present needs. But it is most certainly not more than a moiety of what we shall require in *personnel* and machines should we be again involved in a great European war. The answer to that will be, no doubt, that there will not be another great war. That is merely absurd. There were many, and among them people of high authority, who told us the same thing about the late war—that it could never happen because no Great Power would dare to make war on account of its colossal cost. Or that, if it did happen, we could never become

## Flight—And the Men



Mr. E. BOUDOT, Chief Designer, Grahame-White Co., Ltd.

"Flight" Copyright.



involved as a land Power. Even if we were drawn into the orbit of war our mission would be to keep the command of the seas and that no country could aspire to be at once a great land and sea Power. We know how the course of history falsified these prophecies and the appalling sacrifices their falsity landed us in. What guarantee have we that the prophets will not be wrong in the future as they have been proved in the past, and that, within the next decade or so, we may not be involved in another great war. Certainly there is nothing in the portents for the future to convince the average thinking person that there will be no more war.

In any case, common prudence dictates that we should be prepared and, in so far as our readiness in the air is concerned, we see no reason to modify the opinions we have so often expressed, viz., that such readiness can be best attained by a relatively small active Air Force, backed up by strong reserves. The latter can only be obtained in one way by the encouragement of civilian aviation under State direction and subsidy. General Trenchard has issued his proposals for the active portion of the Air Force, but we are still awaiting a declaration on policy in the matter of civilian aviation, from which our reserves must be drawn. As we have repeatedly urged, while the Government is making up its mind on the matter, the best of the pilots and engineers, to whom we should have looked to form the backbone of those reserves, are becoming tired of waiting and are drifting off into other occupations. Those, too, who financed the industry through the war are likewise becoming tired of the delay, and are seeking fresh employment for their capital. Unless the Government makes up its mind very soon we shall find that there is but the remnants of an industry existing to carry out the active work of development, and we shall have to begin all over again.

#### The Future of the Royal Air Force

In the scheme of organisation of the permanent R.A.F. outlined by Sir Hugh Trenchard, and which we print in full elsewhere, there are many other points which impress themselves on the mind of the one who studies this, the first, scheme for the organisation of a permanent Air Service. It is not possible for the purpose of comment to run right through the document, starting at A and ending at Z, since it is written in a manner befitting so serious and reasoned a document, and one has to go from point to point and often back again to appreciate the full measure of what it means. For example, we find under the head of "Training" that the strong necessity of infusing the proper Air Force spirit into officers and men is present in the mind of Gen. Trenchard, who says of this:—

To make an Air Force worthy of the name, we must create an Air Force spirit, or, rather, foster this spirit, which undoubtedly existed in a high degree during the War, by every means in our power. Suggestions have been made that we should rely on the older services to train our cadets and Staff Officers. To do so would make the creation of an Air Force spirit an impossibility, apart from the practical objection among others, that the existing naval and military cadet and staff colleges are not provided with aerodromes or situated in localities in any way suited for flying training.

We agree most heartily. Indeed, we may recall to our readers' recollection that we constantly insisted upon this aspect at the time of our advocacy of the policy of "One (Air) Service, One Uniform,

One Badge." *Esprit de corps* means everything in a fighting Service. Without it that Service had better be disbanded as an actual danger to the country, for it must come much nearer to being so rather than a reliable instrument of war. Having read the paragraph we have quoted, we then hark back to one of the methods by which it is proposed to secure this desirable "Air Force spirit," and we find that it has been most widely determined to preserve the numbers of some of the great squadrons who have made names for themselves during the War, in permanent service units with definite identity, which will be the homes of the officers belonging to them, and will have the traditions of the War to look back upon. A most excellent idea, this. Not only will the young officer fortunate enough to be posted to one of these famous squadrons feel that he belongs to a great Service, with great traditions, but he will have the added stimulus which comes from being a part of a unit of that Service which is above the ordinary plane, and in which he has the feeling that there are glorious personal records of service and gallantry for him to live up to.

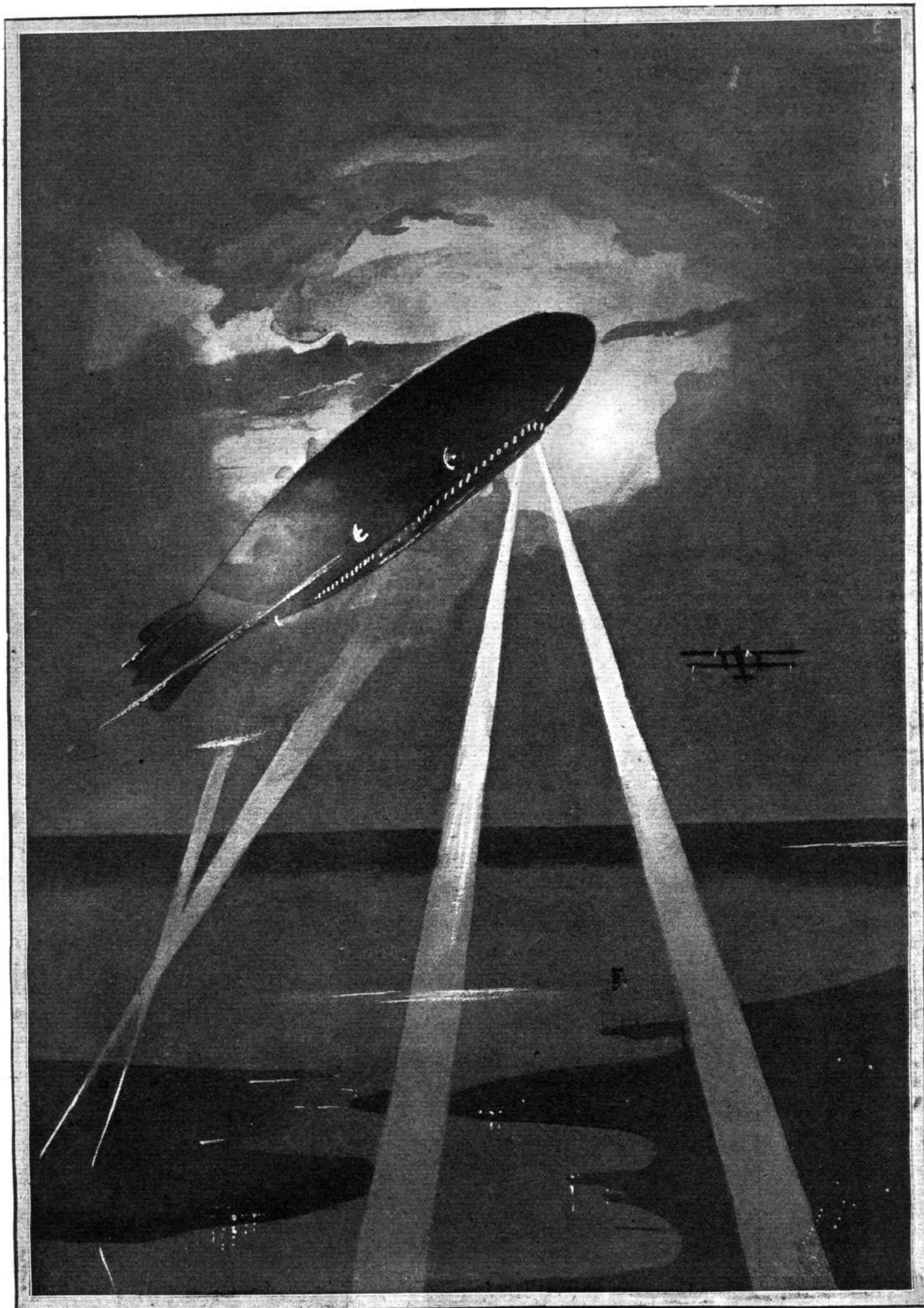
#### Training of Officers and Men

With regard to the training of officers and men, it is pointed out that owing to the great number of junior officers required and the comparatively small number of senior appointments, it is not possible to offer a career to all. Therefore, some 50 per cent. only of the officers have been granted permanent commissions, the remainder being obtained on short service commissions or by the seconding of officers from the Navy and Army. Great importance is attached to this last class, since an interchange of officers is bound to make for closer and more intelligent co-operation between the Services. So far as the training of officers is concerned, this will be carried out initially at the Cadet College, though a certain number of entries will be accepted from the Universities and through the ranks. The full details of the courses to be undergone at the Cadet College were made public some months ago, and were made the subject of comment at the time. There is no need, therefore, to traverse them afresh on this present occasion.

In so far as concerns the men, it has been determined to enlist those from what are termed the long apprenticeship trades as boys, who will undergo three years' training before being passed into the ranks. With a preliminary training of the nature contemplated and the practice of their trade during their service, it is confidently anticipated that these mechanics on passing to civil life will have no difficulty in securing recognition as skilled tradesmen. This is an important consideration, since any tendency for the Air Force to be regarded as a blind alley occupation would be fatal. A scheme has been drawn out for the future enlistment of boys by means of a competitive examination, and local education authorities have been circularised with a view to their nominating suitable boys to sit for the examination. By this means it is hoped to secure a really high standard.

This again is a really excellent plan. By thus making the Air Force relatively difficult of entry not only is the desired high standard likely to be attained, but it tends to lift the Force on to a higher





"Crossing the Coastline"  
1609

*Drawing by Mr. J. McGilchrist*

social plane, so to say, and to bring it to an equality with skilled occupations in civil life—a very direct contrast to the feelings with which the old time Regular Army was regarded in the years before the War.

Reverting to the training of officers once again, it is the intention to institute, though not during the coming financial year, a Royal Air Force Staff College.

This is to be located at Halton House, the residence of the late Mr. Alfred de Rothschild, which together with the whole estate, was purchased by the Government after his death. It is certainly ideally situated for the purpose, overlooking the Vale of Aylesbury, and there is an aerodrome within a quarter of a mile.

This has undoubtedly to come, for in spite of the gibes which are always levelled at the Staff in every war, there can be no success unless the Staff are properly trained for their work. As a matter of fact, we believe it is true that a great many of the mistakes of the early part of the War were due entirely to insufficient Staff training, not only of the improvised staffs of the New Armies but of the Regulars. Staff work has never been given the high importance in the British Army which attaches to it in Germany or France, while the agitation for the creation of a real War Staff at the Admiralty is too fresh in the minds of everyone to need more than a passing mention.

The sooner the R.A.F. Staff College is constituted and gets to work, the better it will be for the future of the Force.

General Trenchard is unquestionably **Research** right when he refers to research as a matter of supreme importance. In this connection he remarks that the Departments of Supply and Research are being transferred from the Ministry of Munitions to the Air Ministry, and a portion of the experimental establishments are a charge on the Air Force Vote. Steady and uninterrupted progress in research, he says, are vital to the efficiency of the Force and to the development of aviation generally, and on it depends the elimination of accidents and the retention of the leading position we have established at such heavy cost during the War. The existing establishments are, therefore, to be retained during the ensuing financial year at a sufficient strength to ensure that urgent work shall continue.

That is good again. We are merely on the threshold of development and there remains much to be done along the lines of research. Some must be undertaken by private enterprise and we doubt not will, but for a long time to come we must look to the State to lead the way as is only right when we regard the fact that all progress is directly beneficial to the State.

The whole Memorandum is good reading. Naturally, we should have desired that it could have gone farther and thrown some light on the future of civil aviation in so far as the Government is concerned with that side of the movement. The only mention, however, is a significant disclaimer in which General Trenchard points out that he has confined himself to the Service aspect of the question.



**MAKING THE WORLD FEEL SMALL:** The winning of the £10,000 Prize, a triumph for Australian grit and British-built aeroplane





## PRELIMINARY REPORT ON BRITISH SECTION

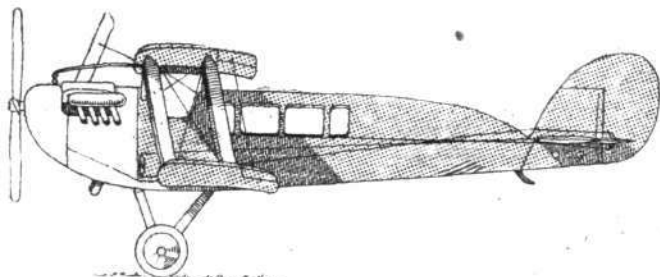
WHEN the doors of the Grand Palais in the Champs Elysées are thrown open tomorrow at 10 o'clock, it will be to admit visitors to the first French aero show since 1913, and the first aero show of any importance held in any country since 1914. It is, therefore, not to be wondered at that this exhibition has created a world-wide interest. Not only is the interval since the last exhibition of such duration as to cause one to look forward to the proofs, which it will furnish, of the progress made in the meantime—and this may be expected to be magnificent—but also the show is the first of its kind to give manufacturers an opportunity of placing before the public their various ideas of the commercial aeroplane in all its aspects. Progress is scarcely to be looked for in the matter of performance—as compared with War machines—nor is any increase in that respect necessary, or even desirable. Much more may we look forward to improvements in the comfort of the passengers, in general reliability, in ease of handling in the air and on the ground, in reasonable stability when flying, and in the practical considerations connected with the running and up-keep of machines.

Although Britain will be fairly well represented, better, possibly, than ever before, there are still a number of firms whom we should have liked to see included among the exhibitors. However, if British manufacturers are outclassed as regards numbers at the show, there is little to fear on the score of quality, and the excellence of British aeroplanes, it may be confidently expected, will be well brought out by the—relatively few—firms which are showing. It is, we

in the meantime a few brief notes indicating the nature of the exhibits may not be without interest.

### The Aircraft Manufacturing Co., Ltd. (Airco)

The main exhibit on this firm's stand will be the new Airco (D.H.) 16. Machines of similar type are, of course, already familiar from extensive use on the London-Paris air route, but the show machine will differ in several respects from the standard type. The chief alteration will be found in the engine unit, which, in the show machine, will be a 450 h.p. Napier Lion instead of the Rolls-Royce with which the standard machine has been doing such excellent work. The fitting of the Lion has necessitated a slight alteration to the nose of the machine, as the new engine is of the "broad arrow" type instead of the usual Vee. The result is a slightly shorter and somewhat differently shaped nose, as shown in the accompanying silhouette. The radiator is no longer fitted in the nose of the fuselage, but is placed some distance back, and protrudes through the floor of the body, much in the same manner as that of the Airco 9R on which Capt. Gathergood recently established a series of British records. The employment of the higher-powered engine has naturally

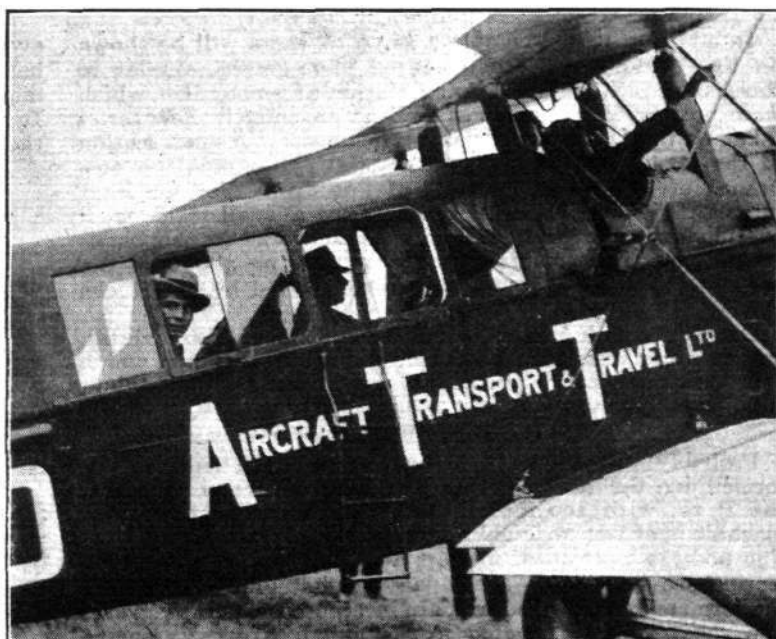


The Airco (D.H.) 16, 450 h.p. Napier Lion

think, generally admitted that British aircraft is second to none, but the fact needs emphasising just the same, and the Paris Show would have provided an excellent opportunity for doing so.

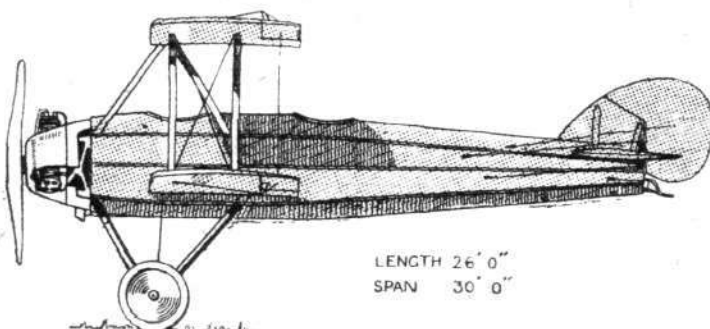
At the moment of writing, six British firms are definitely known to be exhibiting at Paris. It is just possible, but not very probable, that one or two more will come in at the last moment. These six firms are: Airco, Boulton and Paul, British and Colonial, Handley Page, Vickers and Westland.

After the show is opened we hope to be able to give a detailed description of the machines exhibited by these firms;



THE AIRCO 16: This photograph shows the cabin of the standard machine which has been used extensively on the London-Paris air service. The Show machine is similar, except for the engine, which is a 450 h.p. Napier Lion

resulted in a considerably increased performance. The machine is to be shown in full "show finish," with white body, polished aluminium cowl and nickel-plated exhaust pipes, black undercarriage struts and tail skid, and cream wings and tail surfaces.



LENGTH 26' 0"  
SPAN 30' 0"

**The Boulton and Paul P 10, 100 h.p. Cosmos "Lucifer"**

The cabin, as in the standard Airco 16, is designed to accommodate four passengers, two facing forward and two facing aft. It is most luxuriously finished, and will give visitors an excellent idea of air travel *de luxe*.

metal section—i.e., a section in which the full strength of the material can be developed.

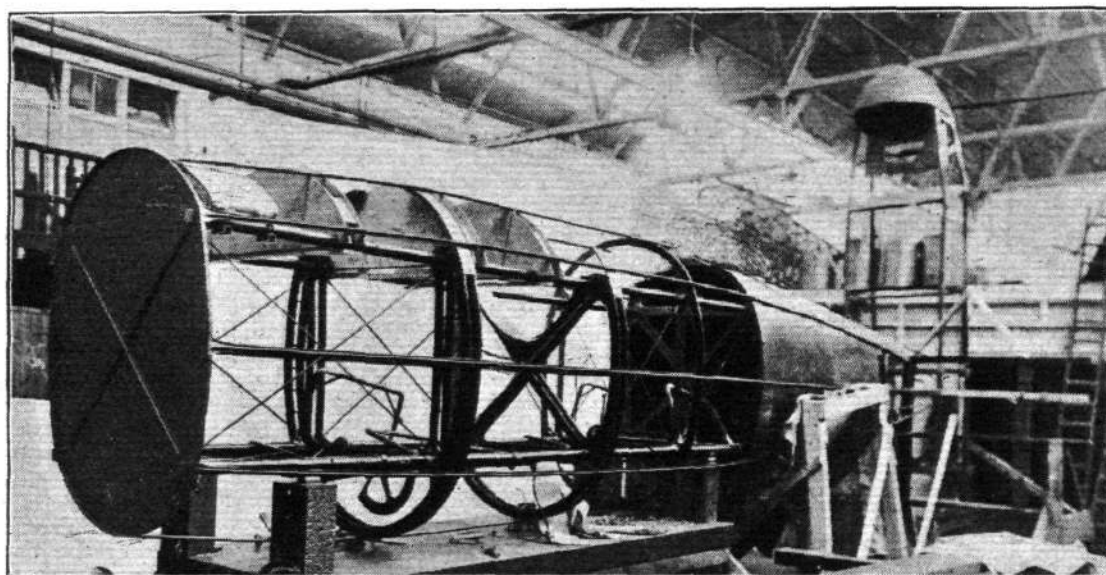
It is not only as regards the fuselage construction that P 10 is built of metal. The wings also are constructed entirely of steel, apart from the fabric covering, of course. The spars are of rolled-steel sections, the results of a number of experiments extending over a considerable period. Dr. Thurston, in his paper read before the Royal Aeronautical Society, mentioned and illustrated one of the Boulton and Paul spar sections, of which these new spars are a development. The ribs also are made of steel, each part being specially designed to fulfil its own particular function.

The mounting of the 100 h.p. Cosmos "Lucifer" engine on the P 10 is of special interest. It is so arranged that by removing the vertical hinge-pin on one side the whole engine and its mounting may be swung about the opposite vertical hinge, thus allowing easy access to the back of the engine for inspection and adjustments. The piping, controls, etc., are so arranged that they do not require disconnecting when the engine is swung out.

This feature of the design is one of the greatest importance from a practical point of view, and one to which other designers would do well to pay attention.

**The British and Colonial Aeroplane Co., Ltd.**

From the very first days of flying and of aero shows, the British and Colonial Aeroplane Co., of Filton, Bristol, have made it a rule to exhibit at the Paris Aero Salons. With the excellent workmanship for which Bristol machines were



**The Boulton and Paul P 10: This machine is built entirely of metal, and should prove a great attraction at the Show**

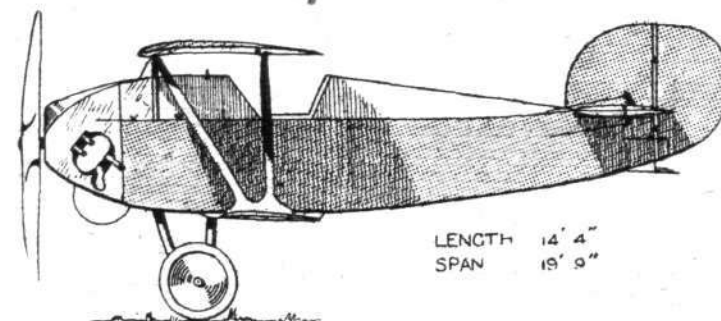
In addition to the complete Airco 16, there will be shown on this stand a series of coloured photographs, similar to those shown at the E.L.T.A. exhibition at Amsterdam, which were greatly appreciated, as well as an entirely new series taken on the London-Paris air service route. A small section of the stand will be devoted to aerial photography, a new branch of the varied interests of this firm. Not the least interesting exhibition this stand will be a small scale-model of Hendon aerodrome, with the Airco works in the background, machines of different types standing about on the aerodrome, and one having its engine started by the Hucks starter.

On this stand Messrs. Airships, Ltd., will also exhibit, among other items, the aeroplane flotation gear upon which this company is specialising, as well as a model of one of their small non-rigid airships, or "aerial yachts."

**Boulton and Paul, Ltd.**

Probably the centre of attraction of this stand will be formed by the new Boulton and Paul all-metal machine, the P 10, with 100 h.p. "Lucifer" Cosmos engine. This machine is of very original design as regards its construction. The body is built-up of formers and longerons of rolled steel sections, as shown in the accompanying photograph. Between the formers and longitudinals are interposed panels of special fibre sheet, which is riveted to the metal parts. Extensive experiments in the rolling of sheet steel strips into suitable sections have enabled Messrs. Boulton and Paul to provide forms of metal construction which have excellent strength/weight ratios and which approach very close to the ideal rolled-

ever famous, it is not too much to say that this firm's stand has always been one of the attractions of the show, and on more than one occasion the Bristols have been the only British machines to be exhibited. This year, as usual, the Bristols are to be shown in Paris, and although the



LENGTH 14' 4"  
SPAN 19' 9"

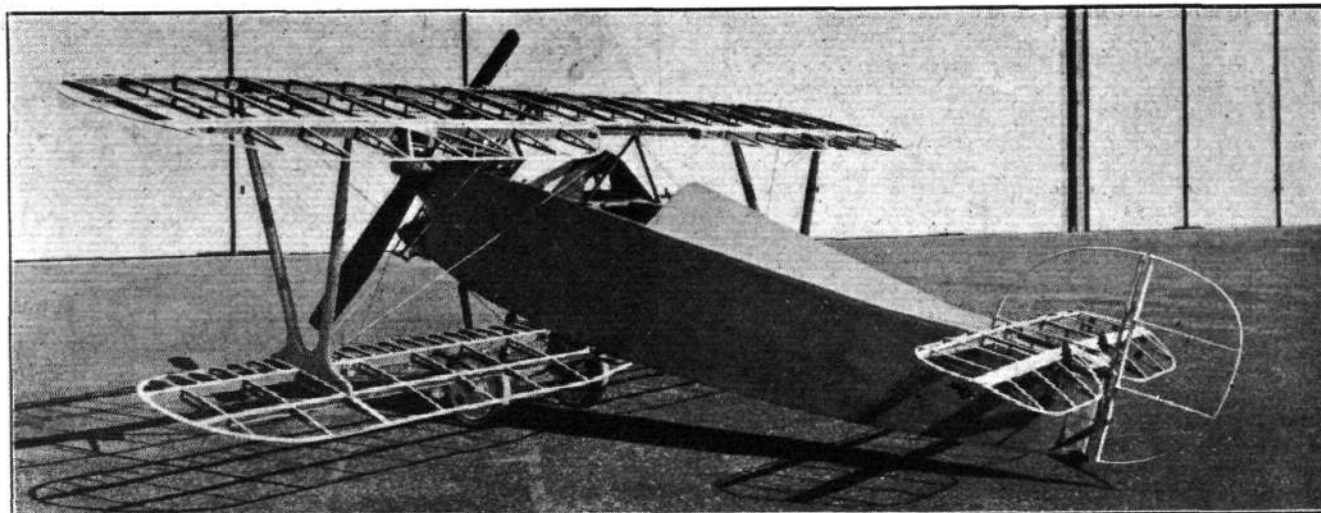
**The Bristol Babe, 40 h.p. Siddeley engine**

representation of Britain is not left solely to this firm, their stand will, nevertheless, be a conspicuous one, no less than three complete machines being shown, while a fourth, the Bristol Pullman, is so large as to prevent the actual machine



from being exhibited. An excellent scale model of it will, however, be on view, and should, in conjunction with illustrations, enable visitors to form a very good picture of the luxurious "Pullman."

lift and landing wires, running to the upper and lower ends of one set of Vee inter-plane struts on each side. The ailerons which are fitted to the top plane only, are of large area, running in fact right from the tip to the centre section.

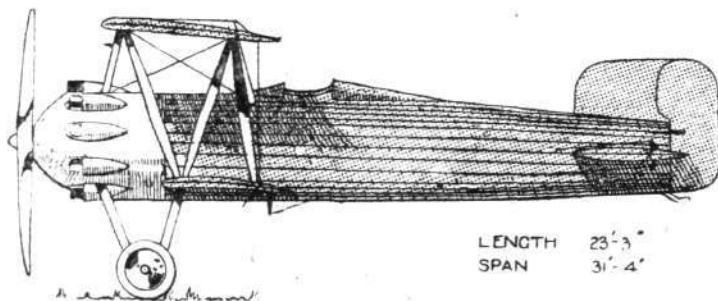


THE BRISTOL BABE : Photograph of the machine in skeleton form

#### *The Bristol "Babe"*

In some respects, perhaps, the small single-seater sporting machine, which will be known as the Bristol "Babe," will have a wider appeal than any of the other Bristols exhibited, as it is a serious attempt to provide the small, compact,

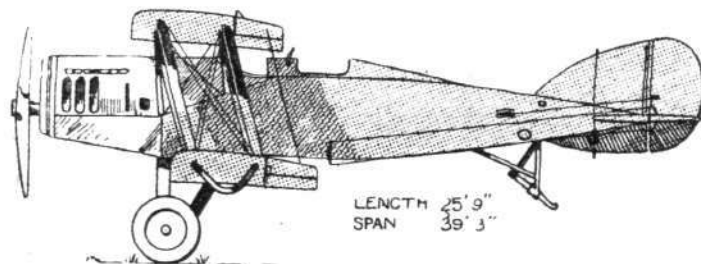
The power plant is a 40 h.p. two-cylindere Siddeley air-cooled engine, which consumes about three gallons of petrol per hour at full throttle, when the speed of the machine is 80 m.p.h. At maximum speed, therefore, the machine does about 27 miles to the gallon, while at the economical cruising speed of 65 m.p.h. even greater economy is attained. The



The Bristol Racer, 450 h.p. Cosmos "Jupiter"

handy and inexpensive sporting aeroplane of the future. It is of quite diminutive dimensions, the overall length being 15 ft. and the wing span 19 ft. 8 ins. The machine does not, therefore, require a large shed for its housing, while its light weight enables it to be handled on the ground with ease by one man.

Ease of maintenance has been aimed at in the design by



The Bristol "Tourer," 230 h.p. Siddeley "Puma"

landing speed is as low as 40 m.p.h., which enables the machine to alight in and start from quite a small field.

#### *The Bristol "Bullet"*

As the name indicates, this machine is one designed for high-speed racing. Its general appearance is indicated in the accompanying silhouette. Fitted with a nine-cylindere

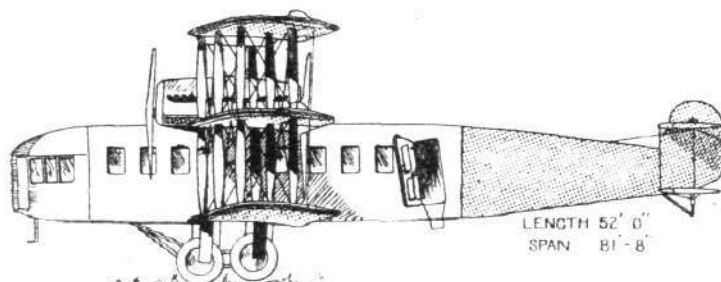


THE BRISTOL TOURER : This machine is similar to the famous F2B, except that it has a Siddeley engine

doing away with as much bracing as possible. Thus the fuselage is covered with three-ply wood, without bracing wires, and the tail is of the cantilever type, also without external bracing. The wings are of the usual type with

radial air-cooled Cosmos "Jupiter" engine, this machine is capable of a maximum speed of 160 m.p.h. As a racer, therefore, the "Bullet" should give a good account of itself in the events of the coming year. A feature—one might

say the feature—of this machine, which is not apparent on a casual examination, is the exceptional strength of the wing structure. This is attained, chiefly, by the novel design of the wing spars, which are in duplicate. In this manner, while adhering to the employment of aerofoils of the usual section, extraordinarily high spar strength is maintained, and we understand that in the case of the "Bullet" the spars

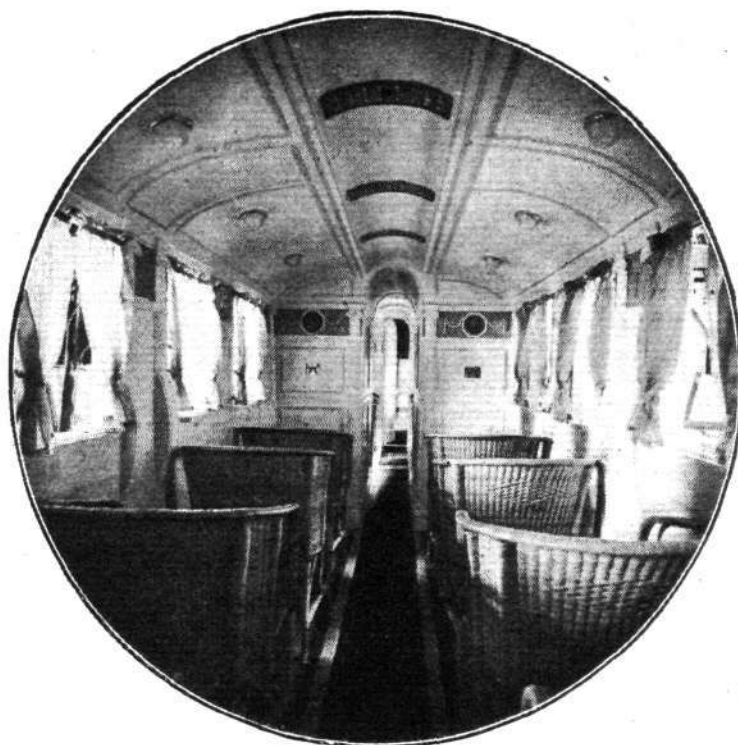


The Bristol Pullman, four 410 h.p. Liberty engines

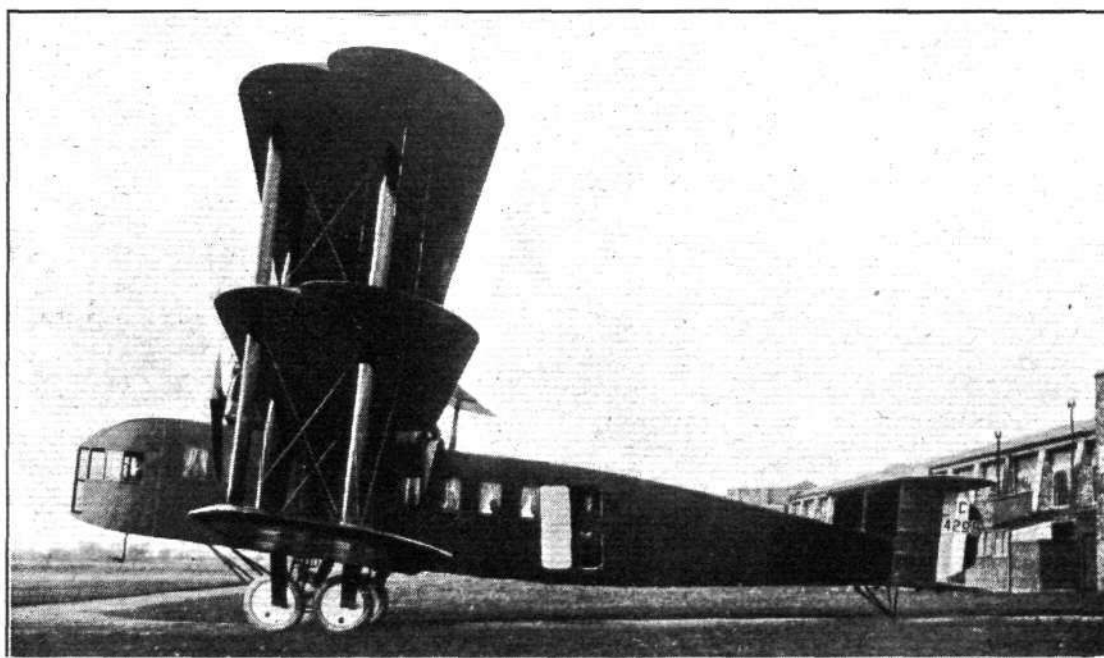
are so strong that any evolution of which the machine is capable may be carried out with perfect safety at the maximum speed of 160 m.p.h. As a racer and "stunt" machine the "Bullet" will probably be much in evidence during 1920. Considering the high maximum speed—160 m.p.h.—the landing speed is reasonably low, *i.e.*, 50 m.p.h. The machine has an overall length of 24 ft. 1 in. and a span of 31 ft. 2½ ins. The petrol tank has a capacity of 50 gallons.

*The Bristol "Tourer"*

The third complete machine to be exhibited on the Bristol stand will be a two-seater of standard type, *i.e.* the "Tourer." This machine is a development of the famous F2B, and differs



THE BRISTOL PULLMAN: Photo. shows one end of the cabin. Owing to lack of space on their stand, the Bristol firm are prevented from showing the actual machine, but a very fine scale model will be on view.



THE BRISTOL PULLMAN: This machine has a cabin seating 14 passengers.

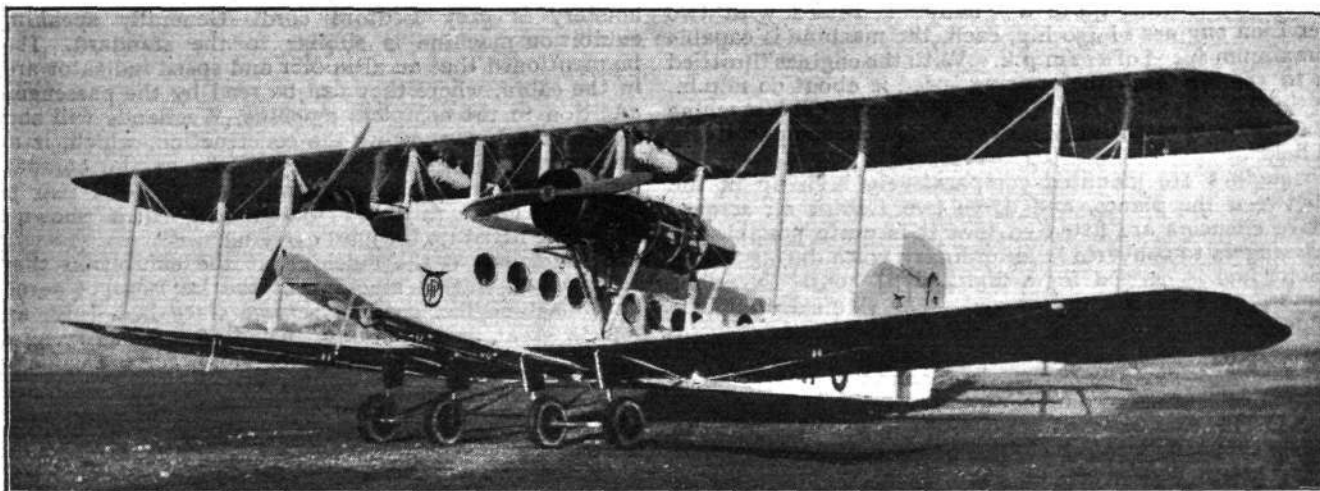
from it chiefly in regard to the rear cockpit, which is now minus the gun ring, while the flat fuselage deck aft has given place for a top fairing. The machine has already been described and illustrated in *FLIGHT*, and no lengthy reference to it will be required here. Its general lines will be clear from the accompanying illustrations, and it will suffice to point out that the machine is one of great dependability, with a cruising radius of about 560 miles. Owing to the fact that the firm, through the cancelling of War contracts, have on their hands considerable quantities of well-seasoned materials which are being employed in the construction of a large number of machines of the "Tourer" type, it has been found possible to place this machine on the market at the extremely moderate price of £1,200. Added to this it should be pointed out that quick delivery can be guaranteed and it would, therefore, appear probable that the demand for this machine should be very considerable. The machine can be supplied either as a two-seater, dual-control touring machine with a radius of 560 miles, or as a cargo and/or

mail carrier, when the cargo capacity is 300 lbs., which can be considerably increased if the machine is to be used for shorter flights than the distance of which the standard machine is capable. The "Tourer" can be supplied either with 275 h.p. Rolls-Royce Falcon or with 230-240 h.p. Siddeley "Puma" engine. With the former engine the maximum speed is about 125 m.p.h., and with the latter 120 m.p.h. The cruising speeds are 90 and 85 m.p.h., respectively. The overall length is 25 ft. 9 ins. and the wing span 39 ft. 3 ins.

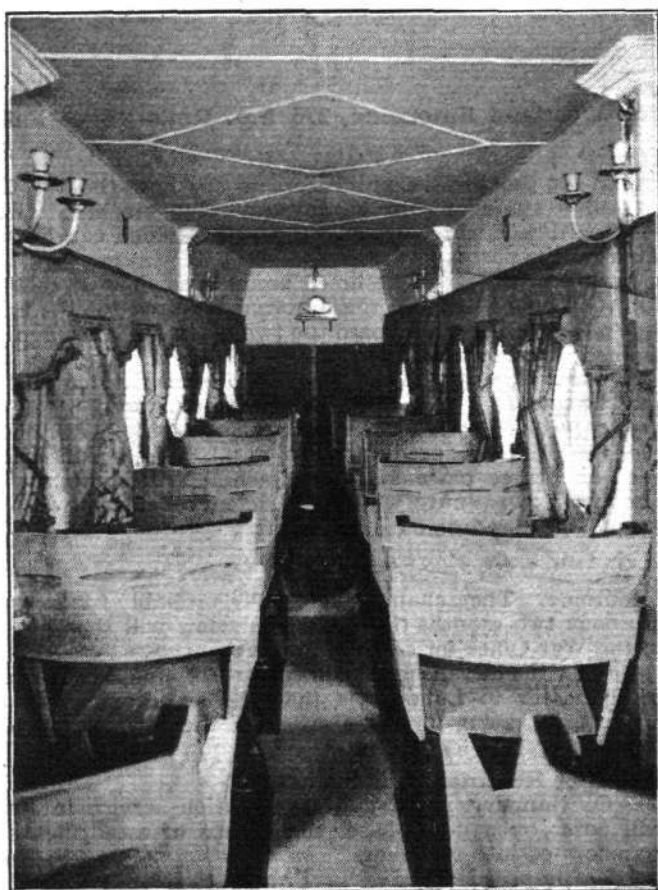
*The Bristol "Pullman"*

As already mentioned, there will be exhibited on the Bristol stand a very fine scale-model of the Bristol "Pullman." This large triplane is provided with a most luxurious cabin, seating 14 passengers, who obtain an excellent view of the country over which the machine is passing, through Triplex windows in the side. One of our photographs gives a very good idea of the comfort and spaciousness of the cabin,





THE HANDLEY PAGE W 8 : Three-quarter front view



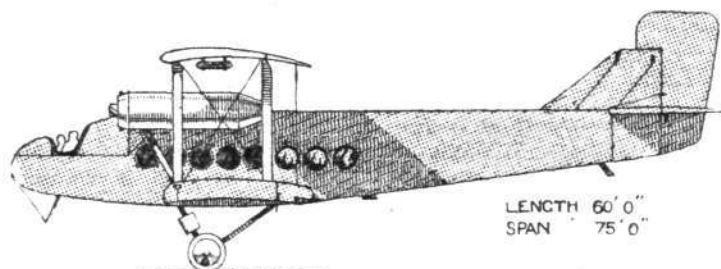
THE HANDLEY PAGE W 8 : View inside the cabin

which has a height of 7 ft., and is heated and lighted by electricity.

Fitted with four 410 h.p. Liberty engines, placed on the wings, the machine is capable of a maximum speed of 125 m.p.h., while the economical speed is 100 to 105 m.p.h. In addition to the two pilots (or pilot and engineer) the Pullman has a lifting capacity of 2,700 lbs., with a fuel capacity of five hours' flight, or 4,000 lbs. with fuel for two and a half hours' flight. These figures are based on an economical speed of 100 to 105 m.p.h., i.e. at three-quarter throttle, giving a sufficient reserve of power to reach a maximum speed of 125 m.p.h. if necessary. If desired, the seats may be removed and the machine used for carrying mails and cargo, the space available being then 570 cub. ft. The machine has an overall length of 52 ft. and a wing span of 81 ft. 8 ins. The weight empty is 11,000 lbs., and fully loaded 17,750 lbs. Climb to 5,000 ft. in 5 mins., and to 10,000 ft. in 12 mins. The ceiling is about 15,000 ft. with full load.

#### Handley-Page, Ltd.

The main feature on this stand will be one of the new Handley-Page biplanes, type W 8, one of which flew to Paris in 2 hours 10 mins. recently, after a brief test flight of only 20 mins. duration. The W 8 is much smaller than either the O 400 or the V 1500, having an overall length of 60 ft. and a span



The Handley Page W 8, two 450 h.p. Napier Lions



THE WESTLAND LIMOUSINE : Three-quarter front view

of 75 ft. It is thus quite a "baby"! Fitted with two Napier Lion engines of 450 h.p. each, the machine is capable of a maximum speed of 112 m.p.h. With the engines throttled down to 350 h.p. each the cruising speed is about 90 m.p.h., while the landing speed is as low as 45 m.p.h. The machine is thus capable of alighting in and starting from comparatively small fields.

The engines are mounted comparatively high up in the gap between the planes, and drive two tractor air screws. Effective silencers are fitted so that it is quite possible for the passengers to converse in an ordinary voice during flight. Sufficient fuel is carried for a flight of 6½ hours' duration, or somewhat over 500 miles, and it is claimed that the machine is capable of flying on one engine entirely, should the other fail.

The passenger cabin is extremely roomy and comfortable, and provides seating accommodation for from 15 to 20 passengers. The seats are well upholstered in velvet, and have on the back pockets in which the passenger sitting behind can keep maps, books, papers, etc. Each passenger is provided with a porthole covered with Triplex glass, while at intervals windows are placed in the floor, giving the passengers a view straight down. The cabin is entered through doors in the sides, and there is also a trapdoor in the floor for the loading and unloading of freight when the machine is to be used for the carrying of goods. In that case the seats are removed and the cargo space available is no less than 470 cub. ft. The lifting capacity is then about two tons. As will be seen from the accompanying illustrations, the Handley-Page W 8 is of very pleasing appearance, and should soon become a favourite with travellers who appreciate speed and comfort.

## Vickers, Ltd.

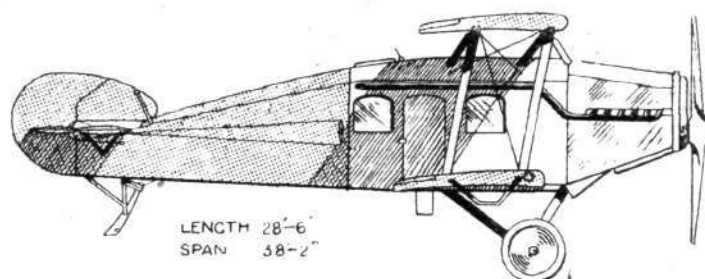
We very much regret that up to the time of going to press no particulars of the machines to be exhibited by this firm were available. Owing to the two successes scored during the year by Vickers-Vimy machines—the crossing of the Atlantic by Sir John Alcock and Sir A. W. Brown, and the flight to Australia by Capt. Ross Smith—the stand is certain to prove a great attraction at the Paris show.

## The Westland Aircraft Works

This firm is showing on stand No. 20 a complete Westland limousine, similar to the standard machine which has been described in *FLIGHT*. The colour scheme is grey and aluminium throughout. The wings and rear portion of the fuselage are grey, while the cabin is aluminium. The up-

holstery is grey Bedford cord. Generally speaking, the exhibition machine is similar to the standard. It might be mentioned that an altimeter and speed indicator are fitted in the cabin, where they can be read by the passengers. In addition to the complete machine, Westlands will show one side of a cabin, showing the construction, which, it may be remembered, is of the unit type, the engine compartment forming one unit, the cabin another, and the rear portion of the fuselage a third. A scale model will be shown of the limousine fitted up for mail carrying.

In addition to the machine at the exhibition there will be a demonstration machine at the Le Bourget aerodrome. This machine has been in service since last July, and has done a great deal of flying, including mail carrying during the railway strike. It will, therefore, form a good oppor-



The Westland limousine, 275 h.p. Rolls-Royce Falcon

tunity for prospective purchasers to see how the Westland limousine stands up to hard wear. The machine will be fitted with hot water heating apparatus, which can be regulated by the passengers.

Both machines will be flown across from Yeovil to Paris, and it is hoped that all the material required for the stand, etc., may be carried on board the two machines, thus avoiding the necessity for any other form of transport.

The overall length of the Westland limousine is 28 ft. 6 ins. and the span is 38 ft. 2 ins. The maximum speed, fitted with 275 h.p. Rolls-Royce Falcon engines, is 115 m.p.h. at 1,000 ft., and the cruising speed is 85/90 m.p.h. With full load of pilot and three passengers the machine will climb the first 1,000 ft. in one minute, which is sufficient for clearing obstacles around the aerodrome on taking-off.

## "Flight" in Paris

THOSE who are visiting Paris for the Aero Show should note that they will be able to obtain copies of *FLIGHT* at the comfortable afternoon tea and reading room of Messrs. W. H. Smith and Sons, at 248, Rue Rivoli, Paris, and also from the Hachette bookstalls.

## Civil Aviation in India

WE have already given details of the proposals regarding commercial aviation in India, and we now publish the following official statement:—It is understood that the Government of India have decided that the development of civil aviation in India will, in so far as mails are concerned, best be attained by granting a monopoly for the carriage of mails throughout India to a single air-transport company, which will not be linked with any aircraft-manufacturing company. The monopoly will be limited to the carriage of mails, the postal rate for which will be fixed by the Government of India.

In fixing rates for the carriage of goods other than mails, and for the carriage of passengers, the company operating the mail monopoly will have a free hand in open competition with any other companies which may be established for such traffic.

## Air Board in India

AN Air Board has been constituted as a purely advisory body to advise the Indian Commerce and Industry Department. This Department now deals with all questions concerning civil aviation. The members of the Board consist of the Secretary to the Government of India (Commerce and Industry Department), the Director-General of Posts and Telegraphs, India, the Officer Commanding the Royal Air Force, a representative of the General Staff, and the Financial Adviser, Military Finance Department. There is also a Secretary of the Board.

## Croydon to Replace Hounslow

A good deal of criticism has been levelled against the selection of Hounslow as the air terminus for London, and it is now stated that a change is to be made to Croydon

aerodrome. The change-over will probably take place in about two months time, and Hounslow will then go back to the War Office for cavalry training purposes.

Among the advantages claimed for Croydon, apart from it being nearer to London, is that the aerodrome is 300 ft. higher, and, being farther away from the river, is much less liable to become fog-bound.

## Aviation Regiments in France

ON January 1 the military aviation service in France will enter on a new phase, the groups of escadrilles being transformed into regiments.

It is proposed to have in France thirteen regiments of aviation, arranged in three groups—observation, chasers, and bombers. There will be seven observation regiments, and three each of chasers and bombers. There will also be one regiment for Algeria and Tunisia and one for Morocco.

## Passports Necessary in Spain

THOSE who are thinking of visiting Spain by air should note that the Spanish Minister of the Interior has just issued an order to local authorities that when foreign aircraft land on Spanish territory a permit issued by the Spanish Government must be produced, otherwise the machine will be seized and the crew and passengers will not be allowed to continue their voyage. Applications for permits should be addressed either to the Spanish Embassy in London or Paris or to the Spanish Consuls in the large towns.

## 'Plane Post in the Congo

IT is hoped that the aerial mail which the Belgian Government is organising between Leopoldville and Stanleyville, in the Congo, should be ready to commence operations before the end of next month. The advance party went out in August, and the remainder of the staff are now on their way. The party includes the well-known pilots Franz Orta and Bastin, both of whom were on active service during the War.

It is proposed to call it the "King Albert Aerial Mail Service," and special stamps are being designed for use in connection with the air mail.



# THE CROWN OF THE YEAR

BY H. MASSAC BUIST.

*Travelling is eating bitterness.*—Chinese saying.

*The perspective of life brightens upon us.*—Goldsmith, "Polite Learning."

*... changed habits of life which always follow from the advent of Europeans.*—Darwin, "Descent of Man."

At least a hundred years will pass before the feats of flying that have made this Advent the very crown of the year will be viewed in true perspective. Unable to foresee the nature of travel through the air scores of years hence, we seize upon the feature of today's achievement which will probably be held in least account when the lapse of time and the forced marches of science and engineering shall have removed those who will then people the earth so far from the conditions that govern our quest of utility aviation in these early stages that it will be possible to see how we builded better than we knew. If any doubt this, let him ask himself if, when the first numbers of *FLIGHT* were issuing from the press, he foresaw either the scale, the nature, or the cardinal details of outstanding accomplishment today?

NUNCA EL MUCHO COSTÓ POCO.

Much never cost little, said a wise Spaniard; and the making of a journey on the magic carpet of the twentieth century from the Motherland to the Commonwealth is a fact more marvellous than Oriental romancers can match with their most amazing fancies. Yet how are we to appraise exactly its various values? Shall we first acclaim the prowess of the pilots Ross and Keith Smith and the mechanics W. H. Shiers and J. W. Beckett, whose splendid endeavour, crowned with unqualified success, stirs the blood of all who share man's common heritage of thrilling to the mere thought of high adventure? If we do so—and who will not?—the very act calls to mind the cost of the enterprise; Lieut. Roger Douglas and Lieut. Ross, engaging in it, were dashed to earth at Surbiton last month; and Capt. C. E. Howell and Airman Mechanic Henry Fraser fell into a watery grave off St. George's Bay, Corfu, at the very moment our heroes were flying the last stages by way of the Netherland East Indies to Port Darwin. Australia gave birth to all eight men; nor shall any say that those who fell by the way were in any wise less fair than those who reached the goal.

Therefore we may learn even today that man does not fly merely by reason of the stoutness of heart and apt skill of the pilot and crew; as Rudyard Kipling has sung:—

*The game is more than the player of the game  
And the ship is more than the crew.*

To know which is not to detract one whit from the sheer magnificence of men whose lives prove that the twentieth century breeds heroes as splendid as were ever celebrated in an epic, or were born, did deeds of derring do and passed unsung in days of old. The airmen trust in the aircraft and, please God, the passage of every season will enable all concerned with the fashioning of them to give them better and yet more excellently serviceable vehicles of the air. Watts would probably have cut a poor figure as the mechanic-in-charge of a steam-engine

day after day, year in and year out; or Faraday of a dynamo; Stephenson of a locomotive; and the Hon. Sir Charles Parsons of a steam turbine. But they are the men who respectively gave us those great inventions which bring to our country such honour as is won by the nations and lead in inventing new means of locomotion, for the history of civilisation is the story of the evolution of travel.

We have not to go outside our Empire to find the men who are enabling us to put a period to that eloignment which has been perforce an outstanding feature of our personal and social relations with our kinsmen in the great and growing Commonwealth to date.

**A Work of Many Minds, Hands and Years.**

The wellnigh forgotten Englishman who first distilled oil in the middle of the last century, what time another Britisher dreamed of, and even made a model of an aircraft which we now know could have been developed into a practical flying machine had there been a third man to produce then an engine in which the spirit distilled from petroleum could have been used; first began the great work which has enabled the crowning achievement in travel this year to be a flight half round the world in 124 hours actual travelling through the air; now storm-tossed, anon sun-scorched; through, snow, rain and drought; running the very gamut of climate from winter weather to warmest summer. An Englishman, too, invented the liquid fuel internal combustion engine before Gottlieb Daimler, the German pioneer, conceived his version of it, built one and applied it to a tricycle with which he took the road.

From the initial to the practical stages, however, is always a long step. The War has had as much to do with making possible a flight from England to Australia this year as any man. The Vickers biplane with the Rolls-Royce aero engine that performed the feat were evolved for War service and applied to civil aerial transport when the main work of human slaughter ceased. The mere idea of an aeroplane, or of an engine, is one thing; the scheme of a particular flying-machine or power unit fit for performing in such-and-such a fashion is another guess matter. To Mr. R. K. Pierson, the designer of the Vickers "Vimy" type biplane, and to Mr. Frederick H. Royce, the engineer who conceived the 12-cylinder water-cooled Rolls-Royce aero engines that drew it through the air stage by stage to the Antipodes, we pay the tribute of a nation made justly proud by their performance. In their turn, however, they would have us mindful of the unseen, unnameable, innumerable workers without whose collective aid they could neither have acquired the necessary knowledge nor had the means of getting their ideas bodied forth in metal, wood and fabric. No one investigator into the science of flying won all the knowledge, and it was needful to employ in fashioning the great, motionless winged aircraft and the light compact heart of it. Nor did any one metallurgist evolve all the grades of steels and alloys used. Nor any one manufacturer discover all the processes needful for production; nor any one wood or metal worker know enough to fashion it in its entirety. A vast company of brains and endeavour has contributed

to a success that is a milestone in the evolution of travel.

## Vague and Erroneous Notions

Yet how do the men and women who people this world to-day grasp the bare idea of it? But dimly, if we are to search the records of the thousands of periodicals which are teeming from the press and are issuing accounts of, and comments on, the feat. Most are tied to the idea of comparison with water travel. That leads them astray alike as to the present accomplishment and future achievement of aviation. Most count the days from port to port, and so unduly belittle aerial travel. Many even go the length of forecasting, as is reasonable, the speeding up of ocean-going travel by some 50 per cent. at some future time. But these both forget that the science and practice of flight is also in advance, and fall into the obvious error of imagining that aerial travel must always be undertaken in precisely the fashion in which this entirely experimental pioneer journey from Europe to the Continent of Australia has been made. Of course, there is nothing to justify that assumption. Indeed, everything indicates that in long-distance work, even in the near future, aerial travel will differ from ocean travel as much in method as that does for the making of journeys by railroad. We know that it is a matter of months only before landing-grounds with expert permanent staffs shall be established on a scheme already arranged for linking up the Empire and the principal countries of the world. We have always known that at any given time different parts of the globe experience markedly contrasted climatic conditions. Aerial travel being so much faster than any known method of journeying by land or water, it follows that in flying half round the globe in a period which, we see, can be counted in terms of hours, it is neither practicable nor necessary for the same crew and machine to make the given journey from start to finish. Even on relatively short railway journeys in this country engines are uncoupled *en route*, and others coupled up to draw the train along the next stage; yet your engine-driver has no navigating to do. He has not even to steer.

Already it is assured that in the much more exacting work of piloting aircraft, the personnel, and even the machines, will be employed in flying certain stages only of the given long route. For one thing, that way you eliminate the fatigue factor as regards the personnel, and you enable each crew to learn their section of the given route like a lesson from a book. There is nothing impractical in employing machines on the relay system. Passengers and loads, such as

mail matter, are quickly and easily passed from one machine to another. Therefore there is nothing visionary in Mr. Douglas Vickers' forecast of a relay aerial mail service between the Motherland and the Commonwealth in seven days. It does not even call for better aircraft and engines than are available at this hour.

## Principle of the Independent Third Arm

The year draws to a close with a manifestation of aerial enterprise which is of more moment to our time than to posterity, because it concerns our immediate problems of national security. Our aerial arm cannot be all that we would wish to make it forthwith, because the financial burdens of the period are already wellnigh insupportable. But, if in cutting our suit according to our cloth we adopt the right principles, we shall have nothing to lament. FLIGHT is concerned with aviation, not with politics, nor with that inevitable outcrop of them, inter-Service intrigue. Most of the daily prints have not sufficient knowledge to give as clear a perspective as students of aeronautics possess concerning the potentialities of our movement, while over many of them, faced with the problems of how to divide national expenditure between the three arms, have little knowledge of the proved effectiveness and possibilities of the youngest, hence they cannot conceive of it as being a thing apart from either of the older services. These are the circumstances in which the nation owes a debt of gratitude to Vice-Air-Marshall Sir Hugh Trenchard for the scheme he has just evolved to a cost limit which necessity imposes. Whatever faults it may have when viewed in this light or that, fundamentally it is the only desirable scheme, because it is based on the Air Service being the Third Arm, independent, yet ever ready to co-operate. It is the duty of every man and woman interested in aviation alike to welcome the scheme, and by talking to their fellow-citizens, to educate them to an appreciation of the correctness of its basic principle. Service instinct apart, it is unreasonable to expect that either sailors or soldiers can yet understand the rôle of aviation in national defence of the present and near future. We have much to fight for, even before the public in general shall become sufficiently educated in the matter; the situation being the more complicated, in that sections of the general Press may be described as tied houses, wherein the advocates of aviation may present their views either partially, or not at all. Hence the need for a strong and influential technical Press; and for all enthusiasts to carry on, each as he can make occasion, the all-important work of championing.

## London-Berlin Flight

A COMMERCIAL Handley Page, carrying five British civilians, landed at the Allgemeine Elektrizitäts-Gesellschaft's aerodrome at Spandau on the morning of December 10, coming from London *via* Cologne, reported *The Times* correspondent in Berlin. The passengers are staying in Berlin pending a decision by the German authorities as to whether they shall be allowed to continue their flight to Warsaw.

## Ex-Soldiers to Learn Flying in Tasmania

THE Australian Government's encouragement of civil flying will include free instruction for returned soldiers taking up commercial flying, says the *Daily Mail* correspondent in Hobart, Tasmania. Numerous companies are forming passenger and commercial air services, both home and inter-State. He adds that many aeroplanes have arrived, mostly Sopwiths.

## A New French Prize

At a general meeting of the Aero Club of France on De-

cember 5 M. Soreau announced the creation of a new prize of 100,000 francs. The regulations are now under consideration.

## To Map the Sahara

IN connection with the aerial survey of the Sahara which is to be made by three French aces, Commandant Vuillemin and Lieut. Dagneau arrived at Algiers on December 2, having flown the 550 kiloms. from Alicante in 2 hours 40 mins. They will also investigate the possibilities of linking up the different French posts in the desert areas by means of aerial services.

## Across the Mediterranean

At one time flying across the Mediterranean was considered somewhat of a feat; now it is all in the day's work of the French aviation service. On December 5 one squadron of seaplanes under Lieut. Lefranc left St. Raphael for Dakar, and another, under Lieut. Guerre, left the same place for Algiers and Bizerta.



# THE ENGLAND TO AUSTRALIA FLIGHT

In our last issue we were able to briefly record the fact that Captain Ross-Smith and his three companions, on their Vickers-Vimy-Rolls, had arrived safely at Port Darwin, in Australia, and so had won the £10,000 prize offered by the Commonwealth Government. As soon as the news reached this country the following messages were at once transmitted to Captain Ross-Smith:—

*From H.M. the King.*—"Delighted at your safe arrival. Your success will bring Australia nearer to the Mother Country, and I warmly congratulate you and your crew." (Signed) GEORGE, R.I.

*From the Prime Minister.*—"Heartiest congratulations. Your flight shows how inventions of war can advance progress of peace." (Signed) D. LLOYD GEORGE.

*From the Secretary of State for War.*—"Well done. Your great flight shows conclusively that the new element has been conquered for the use of man." (Signed) W. S. CHURCHILL.

*From the Air Council.*—"Air Council congratulate you and crew on great skill and endurance shown in your achievement." (Signed) W. A. ROBERTSON, Secretary, Air Council.

*From the Comptroller-General, Civil Aviation.*—"Most sincere congratulations on successful termination of great flight. Your progress has been watched by all here with keenest interest." (Signed) F. H. SYKES.

The following telegram was also sent by the High Commissioner of Australia to Mr. Hughes, the Prime Minister:—

"Have been requested by Royal Aero Club to transmit the following to you: 'Subject to verification of machine, Captain Ross-Smith has fulfilled the conditions laid down by Australian Government for £10,000 prize for flight from Great Britain to Australia. The Royal Aero Club, under whose competition rules and auspices the flight was made, will award prize to Captain Ross-Smith. Royal Aero Club tenders its heartiest congratulations to the Prime Minister and all Australians on the successful accomplishment of this epoch-making flight.' (Signed) FISHER."

Below we publish by the courtesy of the *Sydney Sun* and the *Melbourne Herald*, Captain Ross-Smith's diary, of the historic flight, up to the time of his arrival at Singapore:—

*November 12.*—The Vickers-Vimy leaves Hounslow, after receiving farewell messages from Prince Albert, Major-General Seely, and Sir F. Sykes, Captain Ross-Smith carries copies of *The Times* for the Governor-General and the editors of the *Sydney Sun* and the *Melbourne Herald*.

Weather misty as far as Lympne, but Channel clear. Encountered heavy cloud of snow at Etaples, and climbed

to 8,000 ft. Flew by compass course. Next saw ground three hours later over Roanne, after meeting further snow. Intense cold, 75 deg. frost; instruments frozen, machine covered with ice; food too frozen to eat. From Roanne ground visible times. Very relieved to see Lyons. Favourable wind throughout, but much time wasted avoiding storms. Vimy behaved splendidly. Arrived Lyons 3.40.

*November 13.*—Left Lyons 10.6, fine weather. Sunshine all day; few heavy clouds, otherwise perfect flying day. Flew along Riviera, crossed Gulf of Genoa; Remo, Spezia. Landed Pisa 2.40, too late to get to Rome. Going Taranto to-morrow. Alps looked very fine in sunlight. Vimy O.K.; crew well.

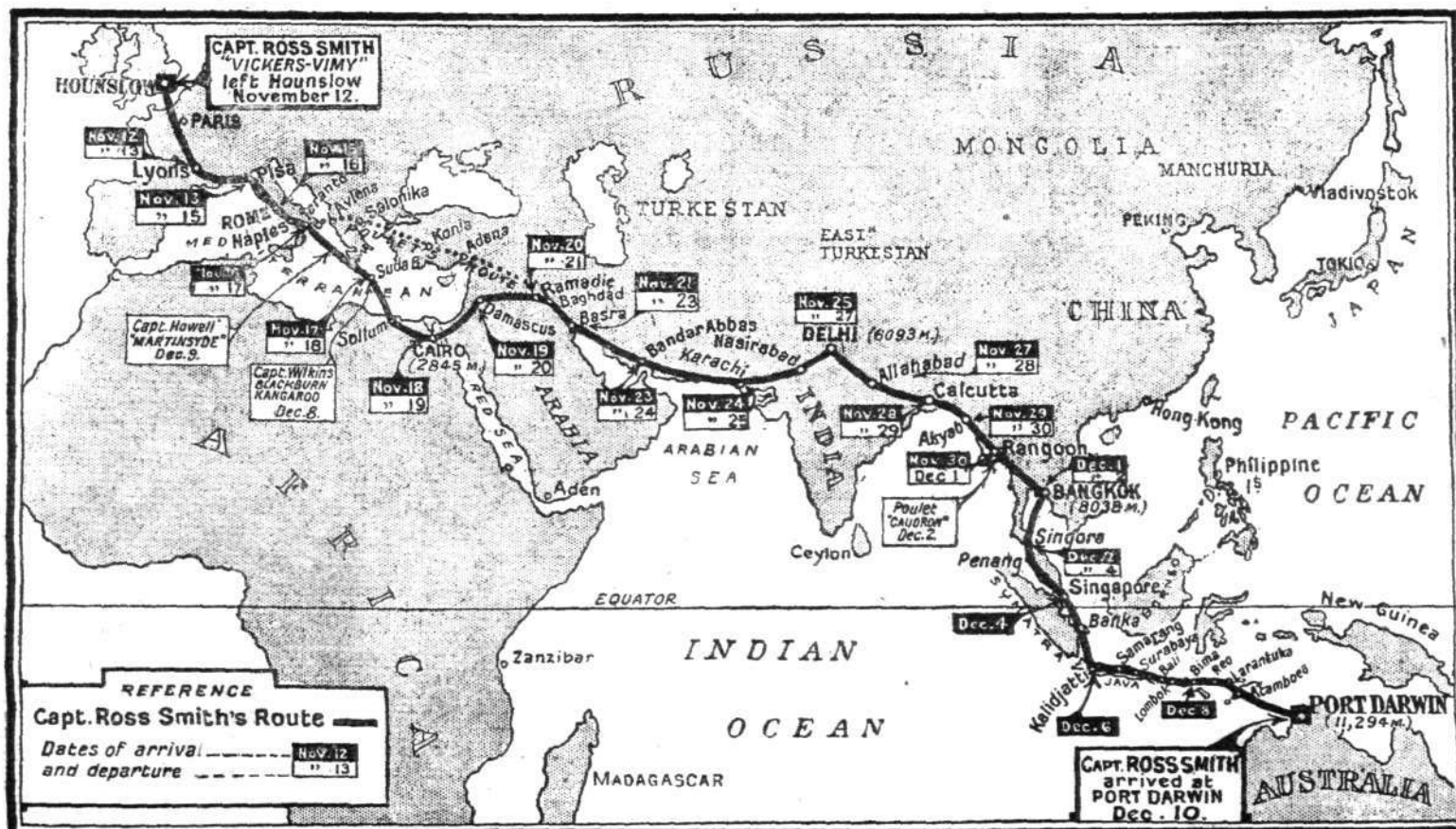
*November 14.*—Yesterday at Pisa heavy rain, aerodrome under water. Attempted to start, got bogged, and spent day on machine.

*November 15.*—Had engines running 8 o'clock to-day; bogged badly in taxi-ing. Used planks and Italian mechanics dug out machine; bogged again, but finally got out. Start sensational. Sergeant Bennett (mechanic) held tail down until machine working, then made running jump at rear cockpit, hauled aboard by Shiers as machine was leaving ground. Aerodrome two inches under water, but Vimy rose beautifully. Crew very wet but cheerful. Encountered strong head wind, ground speed only 50 miles per hour. Passed through some heavy clouds, otherwise hazy and bumpy. Landed Rome 3 o'clock.

*November 16.*—Left Rome 9 a.m. Landed Taranto 11.45. Again low clouds, visibility bad. Passed over Capua and Naples, then turned east over mountains; flew low over Vesuvius, but weather too bad to photograph. Very bumpy over mountains, machine falling several hundred feet at times. Good wind helping us. Greatest assistance afforded us at Taranto by aerial route. Spent afternoon on machine.

*November 17.*—Left Taranto 8 to-day, arrived Suda Bay 3.45. Strong wind on our beam, low clouds, rain all the way to South Greece. Attempted to get above clouds, but too high, so flew at 800 ft. Following coast, nearly hit small island in mist. South Greece to Crete good weather, slight head wind.

*November 18.*—Left Suda Bay 8 to-day, arrived Cairo 3.30. Weather again bad. Low clouds made crossing Cretan mountains difficult. Wind slightly favourable, steered south course after leaving, but had to fly through rain at 2,000 ft. most of the way across the Mediterranean. Passed two steamers half-way; checked ground speed and drift on them. Crossing took 2½ hours. Struck African



LONDON-AUSTRALIA FLIGHT: Map of route, reproduced by courtesy of *The Times*

coast at Sollum, then flew east to Cairo across desert via Matruh. Hope to reach Damascus or Baghdad to-morrow. All very pleased to have got here. Hope for better weather now. So far have taken 30 flying hours, mostly through rain and storms. Throughout greatest assistance rendered by aerial route stations, nothing being too much trouble. It is largely due to their excellent organisation that we are here so soon. Vimy going perfectly.

*November 19.*—Left Cairo 10.30; dull weather. Crossed Canal at Kantara, then over Romani along coast under thick cloud to Gaza. Turned inland to Ramleh, then Haifa. Owing to heavy rain flew low to Jordan over Sea of Galilee, thence to Damascus. Interesting seeing old places again, recalling memories of the war. Landed, Damascus 3. Met many old R.A.F. friends.

*November 20.*—Delayed until 11. First rain since March. Ground getting sticky. Oiled tires to stop mud sticking, and left. Flew low to Tadmor, turned east, crossed desert Abu Kemal, followed Euphrates. Met head wind and landed at Ramadie battlefield at dusk. Pegged down machine. Heavy gale at night. Turned out troops to hold machine; anxious time for two hours, but Vimy weathered the storm.

*November 21.*—Left Ramadie 1.15; good wind; first good flying day of journey. Passed Baghdad, Kut, Garden of Eden, landed Basra 4.40. Overhauling to-day; Bunder Abbas to-morrow. Yesterday weather cheered all considerably after ten days' trying conditions. Crew well; engines behaving beautifully.

*November 22.*—At Basra overhauling machine and engines, making adjustments; nothing wrong.

*November 23.*—Left Basra 6.30; perfect day, beautiful sunrise. Flew over Bushire along coast Persian Gulf, landed Bunder Abbas (Persia), 2.20. Nearly eight hours in the air; machine never faltered. Persian coast very rough and barren. Passed several R.A.F. emergency grounds. Welcomed here (Bunder Abbas) by British Consul, the O.C. troops, and the local Persian Governor. Great interest manifested by local inhabitants; some had never seen an aeroplane. Hope to reach Karachi to-morrow if wind favourable, otherwise Charbar.

*November 24.*—Left Bunder Abbas to-day 7.30; arrived Karachi 4.10. Good day, uninteresting scenery. Followed coast all the way. Engines and machine no trouble; crew rather tired after nearly nine hours' flying. Welcomed in India by General Fowler and Air Force, also a party of Australians who "coo'eed" lustily. Weather much warmer—a contrast with England 13 days ago. Hope to reach Delhi to-morrow if wind favourable.

*November 25.*—Left Karachi to-day 7.40, arrived Delhi 4.30. Journey uneventful. Good day, slight head wind. Met by General MacEwan and numerous others. All Air Force arrangements perfect; greatest assistance. During last three days have flown 25 hours, covering 1,600 miles. Machine and engines no trouble; crew well. Allahabad next, possibly to-morrow.

*November 26.*—Remained at Delhi resting.

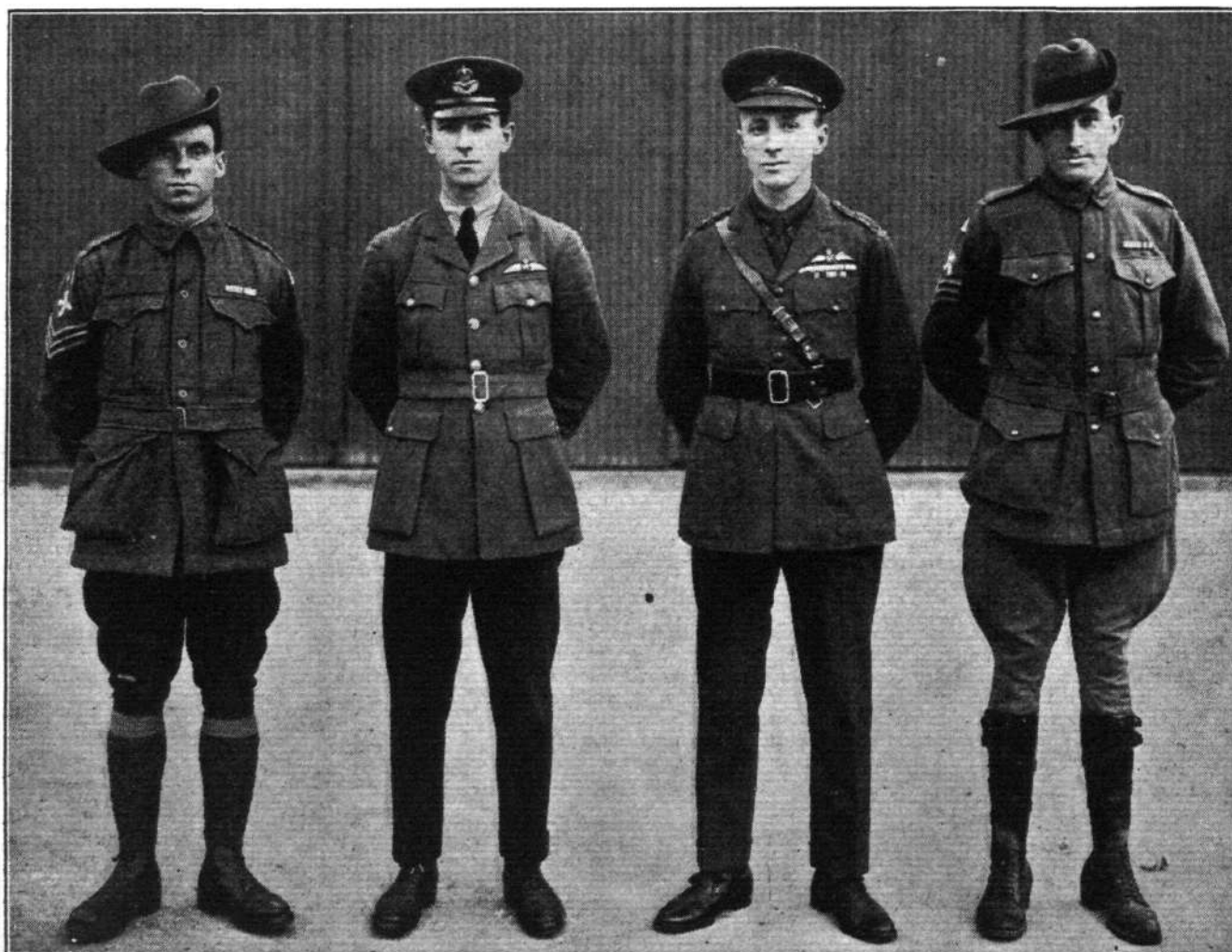
*November 27.*—To-day at 10.30 flew over city 10 minutes, then started Allahabad. Near Muttra one oil gauge "dud." Landed and repaired. Continued; after 90 minutes landed at Allahabad 5 p.m. Good flying. Passed Taj Mahal at Agra; Cawnpore. Crew and machine well.

*November 28.*—Left Allahabad 8.30, arrived Calcutta 1.45. Good trip. Following wind, clear sky, uneventful. Landed on the racecourse; large crowd. All well. Akyab to-morrow.

*November 29.*—Left Calcutta 8.30; landed Akyab 1 p.m. A large and distinguished gathering to see us off, including Lady Ronaldshay and many cinemas and cameras. Great interest was displayed in machine, especially in the parts which flew the Atlantic with Alcock. The racecourse at Calcutta is small when taking off. Many hawks were circling round close to the ground. We were very frightened that a hawk would hit the propeller and smash it.

Just off the ground the machine struck two hawks, one hitting the propeller at a nasty moment as the machine almost hit the trees in avoiding more birds. No damage to the propeller, but pieces of hawk were hanging on the machine the whole journey.

Circled Calcutta and flew east to Chittagong across mouths of the Ganges, and then south in good weather. Poulet here. Both machines leave for Rangoon to-morrow. All well.



The WINNERS OF THE £10,000 PRIZE: the crew of the Vickers-Vimy-Rolls. From left to right: Sergt. W. H. Shiers, A.F.M., Lieut. K. M. Smith, R.A.F., Capt. Ross Smith, M.C., D.F.C., A.F.C., and Sergt. J. M. Bennett, M.S.M., A.F.M.



December 1.—Arrived at Bangkok. Greatest assistance and courtesy shown by Prince Pitsanoluke and aviation corps.

December 2.—Left Bangkok 7.0 and arrived at Singora at 1. Escorted first 50 miles by four Siamese machines. Course south along east coast of Malay Peninsula. First two hours good, then met heavy monsoon; rain, wind strong and changeable, sometimes helping and sometimes against. Necessary to fly 500 ft. three hours, following coast. Almost blinded with rain, but country impossible for landing. Had to continue, hoping for the best. Worst flying conditions ever encountered. Last hour better. The aerodrome at Singora is bad and stumpy. Had to land in a crosswind on a small dry patch. Safely down with luck. Later, taxiing the machine, tail skid caught root and broke fitting; not serious. Great interest of local population in seeing their first aeroplane. Decided that, owing to weather, we could not reach Singapore without more petrol. Wired Asiatic Petroleum Company, Penang, to send urgently. During night heavy squalls; crew held machine all night. Great assistance and hospitality, Prince Yugala and local officials.

December 3.—Torrential rain with wind. Repaired skid, crew wet through, working on machine all day cheerfully. Petrol arrived evening; raining too hard to put in.

December 4.—My birthday. Weather bad. Decided to try for Singapore. Left Singora 10, arrived Singapore 5. Take off at Singora very rough, but convicts had cleared stumps yesterday. Aerodrome very wet in patches. Got off in a cross wind—lucky. Rain all the way. Flew 2,000 to 500 ft. all the way. Great reception here, huge crowd.

After leaving Singapore, on December 6, Capt. Ross Smith flew round a large thunderstorm and travelled down the east coast of Sumatra for 200 miles, then over the sea to Batavia and Kalidjatti, where the Dutch Governor-General gave a warm welcome. The next day the stage to Sourabang was completed, but the machine was bogged on landing. It was necessary to make a path of bamboo mats in order to get off, but the next day they went on to Bima. Another stage to Atamboca in Timor Island was completed without mishap, and on Wednesday, December 10, the last lap to Port Darwin was successfully made, the machine landing at Fannie Bay at 3.40 p.m. (5 a.m. G.M.T.).

## ◆ ◆ ◆ ◆

# THE AIR ESTIMATES

THE Air Estimates of effective and non-effective services for the year 1919-20 were issued as a White Paper on Dec. 13. In a statement issued therewith, Mr. Churchill writes:—

"The Air Estimates as now presented to the House of Commons amount to a net sum of £54,030,850, which is less by £12,460,150 than the forecast of £66,500,000 shown in the White Paper presented last March.

Since the forecast of £66,500,000 was framed, it has been arranged that provision shall only be made in Air Estimates for the cost of aircraft and equipment which the Air Ministry agreed to accept after the Armistice and not for the cost of liquidation of all aircraft contracts placed by the Ministry of Munitions. As a result of the progress made with the organisation of the Air Force on a peace basis, it has also been possible to reduce the programme for the supply of aircraft and equipment. By these means a reduction of approximately 13½ millions has been effected.

The reduction of the programme has also resulted in a saving of approximately 1½ millions in respect of building accommodation and land.

A further reduction of approximately £2,000,000 has been effected in consequence of the programme of the Controller-General of Civil Aviation and the Director-General of Supply and Research being still in the process of development and not having yet fully matured. In addition it has been found possible to meet the requirements of these departments from existing stocks to a greater extent than was originally anticipated.

It has, on the other hand, been necessary to make additional provision of approximately 4 millions for certain services which could not be foreseen in March. The chief of these items are as follows:—

Demobilization of officers proceeding more slowly than was anticipated and decision to pay outfit gratuities to cadets, etc., less reduction due to decision to abolish Women's Royal Air Force, and to the demobilization of men proceeding more rapidly than was anticipated .. .. . 3½

Increased charges for fuel, provisions, etc. .. 1½

Cost of the airship service on transfer from the Admiralty .. .. . 2

It is necessary to bear in mind that a very large proportion of the sum required for 1919-20 is in respect of charges

THE Air Ministry announces that messages of congratulation on the successful termination of the flight to Australia have been sent to Messrs. Vickers, Ltd., constructors of the Vickers-Vimy machine, and Messrs. Rolls-Royce, Ltd., the manufacturers of the engines with which the machine is equipped. Sir Frederick Sykes, Controller-General of Civil Aviation, sends sincere congratulations to both firms on their achievement "in providing the winning machine for the Australian and Atlantic flights." The Air Council sent the firm's congratulations on "the great feat of building and equipping the machine."

The machine is a Vickers-Vimy, fitted with two 350 h.p. Rolls-Royce Eagle Mark VIII engines. The span is 67 ft. overall length, gap 10 ft., chord 10 ft. 6 ins. The maximum speed is 100 miles per hour. The weight of the machine empty is 3 tons. A description of the machine with scale drawings appeared in our issue of November 6.

### The Tragedy at Corfu

It is with the greatest regret we have to record the fatal ending of the attempt of Capt. Howell and Air-Mech. H. Frazer to fly to Australia on the Martinsyde-Rolls machine. The news came in the following telegram from Lloyd's agent at Corfu on December 13:—

"Information just received British aircraft wrecked off St. George's Bay, Corfu, December 10. No hope of survivors. Log washed ashore. Certificate number 33. Identification mark G.U.M.R., Capt. C. E. Howell, Melbourne. No. licence 412, Hounslow for Melbourne."

The machine had arrived at Taranto on December 8, and left on the following day for Athens. Mrs. Howell is travelling to Australia in the s.s. *Orsova*.

No further news has been received of Poulet, but strong representations have been made in Australia that the Commonwealth should invite the Frenchman to continue his journey to Australia, and offer him £1,000 in the event of his completing the flight. In the meantime it is understood that Poulet is to be awarded the Medaille Militaire for his work during the War and for his present flight. He intends to return by air to Paris, and to prepare for a flight round the world.

arising out of the war and for which no provision will be required in a normal year. Amongst these items may be mentioned the war gratuities to officers and men, the pay and maintenance of surplus personnel, the repatriation of officers and men from the Colonies, and the maintenance of surplus aerodromes, etc., pending their disposal.

Regard should also be had to the fact that the amount required for 1919-20 includes provision for the purchase of large stocks of aircraft, engines and equipment which were ordered prior to the Armistice, but which will be available, so far as can at present be foreseen, to meet requirements during two or three years.

Finally, it must be remembered that at the date of the Armistice the total expenditure in respect of the R.A.F. was in excess of £1,000,000 per diem, and that the provision for the present financial year is necessary not only to meet the normal requirements of the Force, but also to meet the heavy charges involved in a transition from war to peace conditions.

Moreover, the R.A.F. has been engaged in active operations in India, Egypt, North Russia and the Baltic almost continuously throughout the year."

The Estimates show that the maximum number of officers and men on the establishment of the R.A.F. at home and abroad, exclusive of India, is 150,000. This number will be reduced by March 31, 1920, to 35,000. The estimated expenditure, after deducting appropriations in aid, is £54,030,850, made up as follows:—

Pay, etc., of the Air Force .. .. .	21,051,000
Quartering stores (except technical), supplies, animals and transport .. .. .	6,103,000
Technical and warlike stores .. .. .	19,322,850
Works, buildings and lands .. .. .	6,402,000
Air Ministry .. .. .	692,000
Miscellaneous effective services .. .. .	203,000
Half-pay, pensions and other non-effective services .. .. .	257,000

The £692,000 to defray the expense of the Air Ministry is divided into: salaries and allowances, £613,323; pay of messengers and porters, £76,777; and contingent expenses, £2,000.

In the Vote for the non-effective services the largest sum, £233,000, is devoted to pensions and gratuities to wounded officers.

# THE PERMANENT ROYAL AIR FORCE

THE following outline of the scheme for the permanent organisation of the Royal Air Force, prepared by Air-Marshal Sir H. Trenchard, was issued as a White Paper on December 13, with the following prefatory note by the Secretary of State for Air:—

The scheme outlined in the following memorandum on the permanent organisation of the Royal Air Force has been prepared during the course of the present year under my directions by the Chief of the Air Staff, and has in principle received the approval of the Cabinet.

The many complications of the Air Service and its intricate technical organisation are not perhaps fully appreciated, even by those who take a general interest in the subject. It therefore appears desirable to lay this memorandum in both Houses of Parliament, in order that they may understand the character of the problem and the complications that are being faced.

It should be added that the financial provision which the Cabinet have approved as governing the scale of the Royal Air Force during the next few years is approximately £15,000,000 per annum. It is upon this basis that this scheme has been prepared, and it is upon this basis that it is hoped the Estimates of next year will, apart from any extraordinary expenditure which the military situation may render necessary, be framed.

WINSTON S. CHURCHILL.

December 11, 1919.

## Memorandum by the Chief of the Air Staff.

1. *The problem confronting us.*—The problem of forming the Royal Air Force on a peace basis differs in many essentials from that which confronts the older services. The Royal Air Force was formed by the amalgamation of the Royal Flying Corps and the Royal Naval Air Service, and one may say, broadly speaking, that the whole Service was practically a war creation on a temporary basis, without any possibility of taking into account that it was going to remain on a permanent basis. The personnel with few exceptions was enlisted for the duration of the War, and put through an intensive but necessarily hurried course of training. Material was created in vast quantities, but rapid development often rendered it obsolete almost before it had reached the stage of bulk production. The accommodation provided had perforce to be of an entirely temporary character. The force may in fact be compared to the prophet Jonah's gourd. The necessities of war created it in a night, but the economies of peace have to a large extent caused it to wither in a day, and we are now faced with the necessity of replacing it with a plant of deeper root. As in nature, however, decay fosters growth, and the new plant has a fruitful soil from which to spring.

The principle to be kept in mind in forming the framework of the Air Service is that in the future the main portion of it will consist of an Independent Force, together with Service personnel required in carrying out aeronautical research.

In addition there will be a small part of it specially trained for work with the Navy, and a small part specially trained for work with the Army, these two small portions probably becoming, in the future, an arm of the older services.

It may be that the main portion, the Independent Air Force, will grow larger and larger, and become more and more the predominating factor in all types of warfare.

2. *Governing principles.*—In planning the formation of the peace Royal Air Force it has been assumed that no need will arise for some years at least for anything in the nature of general mobilization. It has been possible therefore to concentrate attention on providing for the needs of the moment as far as they can be foreseen and on laying the foundations of a highly-trained and efficient force which, though not capable of expansion in its present form, can be made so without any drastic alteration should necessity arise in years to come. Broadly speaking, the principle has been to reduce service squadrons to the minimum considered essential for our garrisons overseas with a very small number in the United Kingdom as a reserve, and to concentrate the whole of the remainder of our resources on perfecting the training of officers and men.

It is intended to preserve the numbers of some of the great squadrons who have made names for themselves during the War, in permanent service units with definite identity, which will be the homes of the officers belonging to them, and will have the traditions of the War to look back upon.

There will be found in the Appendix a statement showing detailed particulars of squadrons, stations, schools, depôts, etc., which it is hoped to provide in the next three years at

home and abroad. It will be understood that this programme is to be regarded as provisional only.

3. *Service units.*—It is proposed to provide eight squadrons for India and three for Mesopotamia, with the necessary facilities for repair. As regards India this is in accordance with a proposal put forward from India and now under consideration by the Government of India. The cost of the units in India will fall on the Government of India on exactly the same basis as in the case of the military garrison. Recent events have shown the value of aircraft in dealing with frontier troubles, and it is not perhaps too much to hope that before long it may prove possible to regard the Royal Air Force units not as an addition to the military garrison but as a substitute for part of it. One great advantage of aircraft in the class of warfare approximating to police work is their power of acting at once. Aircraft can visit the scene of incipient unrest within a comparatively few hours of the receipt of news. To organise a military expedition even on a small scale takes time, and delay may result in the trouble spreading. The cost is also much greater, and very many more lives are involved.

In Egypt it is proposed to station seven service squadrons. Under existing conditions in that country aircraft are a most valuable means of communication. Distances are long and ground communication confined to a few main routes. On the other hand the country and the climate are both ideal for flying. From a wider aspect Egypt is the Clapham Junction of the air between east and west, and is situated within comparatively easy reach of the most probable centres of unrest, and this, added to its natural advantages for aviation, makes it the obvious locality for a small Royal Air Force reserve.

As regards our Naval bases and important coaling stations overseas, future developments will almost certainly lead to the necessity of providing aircraft as part of their garrisons, but in the majority of cases the need of this is not urgent under existing conditions, and for the present it is only proposed to station a small seaplane unit at Malta, and a similar unit in the Eastern Mediterranean, probably at Alexandria.

The Service squadrons quartered in the United Kingdom apart from those for co-operation with the Army and Navy will eventually number four, but not more than two of these squadrons will be formed in the next financial year. These squadrons will be employed on communication and similar duties in peace and will form a small reserve in case of need. For co-operation with the Army it is proposed to provide eventually squadrons on the basis of a flight per division for work with the troops at all stages of their training, and in addition one or more squadrons for co-operation with the artillery both during their winter training and their annual gun practice. During the next financial year it is proposed to form two squadrons in all, one at Farnborough for co-operation with the troops at Aldershot and Salisbury, and the second at Stonehenge for work with the artillery. Small units will, if necessary, be provided in addition for co-operation with the Garrison Artillery School at Golden Hill, and the Anti-aircraft School when formed.

There remain the Service squadrons for co-operation with the Fleet. It is proposed eventually to provide at home three aeroplane squadrons and two seaplane squadrons. To secure economy and to give the units a corporate existence and ample facilities for practice it has been decided that aeroplanes will no longer be carried normally in capital ships as was done during the War, but will only be embarked when required to take part in Fleet exercises. The aeroplane squadrons will consist of one reconnaissance and spotting squadron, one squadron of fighter machines and one of torpedo-carrying machines. The two former will be based on the Firth of Forth where ample facilities exist for practice and for the embarkation and disembarkation of machines, a most important point. The torpedo-carrying squadron will be located at Gosport, the most suitable station for torpedo work, and it is proposed to provide a small experimental unit at the same station in order to develop fully this form of co-operation with the Navy, which is of primary importance. Of these three squadrons it is only proposed to provide one, the reconnaissance squadron, at full strength in the ensuing financial year. This is necessary in order to study and perfect the system of observation of artillery fire which from various causes was not so highly developed on the naval side as on the land side during the War. The torpedo squadron will be maintained at sufficient strength



to carry on the essential research work while the fighting squadron will be formed in the first instance at a strength of one flight only.

In addition, the Admiralty propose to keep two aircraft carriers in commission. One of these will be equipped with seaplanes for service abroad, while the other will remain at home and be used primarily for training and experimental purposes and ready if necessary to embark a flight of torpedo or other machines.

The provision of these two carriers is of the first importance since we must look forward to the time, as suitable machines develop, when fleets will so to speak take their aerodromes with them in the shape of a carrier, and the carriage of aircraft on capital ships with its attendant disadvantages and dangers will be a thing of the past.

Of the two seaplane squadrons, it is only proposed at present to form one flight only. The seaplane has obvious advantages over the aeroplane for long distance work over water, and a time may probably come when all work in co-operation with the Navy will be done by this class of machine. For this reason, if for no other, it is essential to have a few such units.

The lighter-than-air service is a difficult problem. The cost of providing such a service on a large scale in peace is prohibitive, and the use of airships in war may be said to be still in the experimental stage. It is proposed therefore to keep one airship station only, namely Howden, where sufficient accommodation exists for two rigid and a few smaller ships, and to retain as a commencement one rigid and two non-rigids only. This will allow research work and development to continue, and the use of airships in peace and war to be further studied.

4. *Reserves.*—Although mobilization on a large scale is not taken into account, it is very necessary to provide a small reserve to meet any sudden call in the case of a small war anywhere in the Empire. For the next year or two there will, doubtless, be no difficulty in enrolling as many ex-officers and men as are likely to be required, and all that will be necessary will be to provide facilities for their training and practice flying.

It is intended, however, if possible, in addition, to lay the foundation of a future Air Force on a territorial basis. No detailed scheme has yet been worked out, but it is probable that the eventual organisation will provide for training both on a unit and on an individual basis. It is hoped that the manufacturing and commercial firms will assist by forming units of their employees. In addition there will doubtless be many individuals who will be glad to train themselves voluntarily with a certain amount of state assistance, and to undertake to serve, either overseas or at home, if called upon to do so. It is not intended to embark on the formation of any units during the next financial year, but it is proposed to commence with the training of individuals in the populous centres. This training will be carried out at the flying training wings whose functions will be described below.

5. *Extreme importance of training.*—We now come to that on which the whole future of the Royal Air Force depends, namely, the training of its officers and men. The present need is not, under existing conditions, the creation of the full number of squadrons we may eventually require to meet strategical needs, but it is first and foremost the making of a sound framework on which to build a service, which while giving us now the few essential service squadrons, adequately trained and equipped, will be capable of producing whatever time may show to be necessary in future.

Before explaining our proposals in detail it is necessary to lay down certain postulates.

Firstly, to make an Air Force worthy of the name, we must create an Air Force spirit, or rather foster this spirit which undoubtedly existed in a high degree during the War, by every means in our power. Suggestions have been made that we should rely on the older services to train our cadets and staff officers. To do so would make the creation of an Air Force spirit an impossibility apart from the practical objection, among others, that the existing naval and military cadet and staff colleges are not provided with aerodromes or situated in localities in any way suited for flying training.

Secondly, we must use every endeavour to eliminate flying accidents, both during training and subsequently. This end can only be secured by ensuring that the training of our mechanics in the multiplicity of trades necessitated by a highly technical service, is as thorough as it can be made.

The best way to do this is to enlist the bulk of our skilled ranks as boys and train them ourselves. This has the

added advantage that it will undoubtedly foster the Air Force spirit on which so much depends.

Thirdly, it is not sufficient to make the Air Force officer a chauffeur and nothing more.

Technical experts are required for the development of the science of aeronautics, still in its infancy. Navigation, meteorology, photograph and wireless are primary necessities if the Air Force is to be more than a means of conveyance, and the first two are requisite for safety, even on the chauffeur basis.

6. *Training of officers.*—It is now necessary to sketch very briefly the training proposed for both officers and men. Owing to the necessity of a large number of officers in the junior ranks, and to the comparative paucity of higher appointments, it is not possible to offer a career to all. Consequently some 50 per cent. only of the officers have been granted permanent commissions, the remainder being obtained on short service commissions or by the seconding of officers from the Army and Navy. Great importance attaches to the last class since an interchange of officers is bound to make for closer and more intelligent co-operation between the services.

The channels of entry for permanently-commissioned officers will be through the Cadet College, from the Universities and from the ranks. The cadet college will be the main channel. The course will last two years, during which the cadets will be given a thorough grounding in the theoretical and practical sides of their profession, and will in addition learn to fly the approved training machine, at present the Avro. The college is to open at Cranwell in Lincolnshire early next year, an ideal place for the purpose, with a large and excellent aerodrome and perfect flying surroundings. It will be necessary to accommodate the college temporarily in huts erected during the War, but every endeavour has been made to render these as suitable as possible, and it is proposed to erect a permanent college in the near future. On leaving the college, cadets will be commissioned, and will undergo a short course in air pilotage and practical cross-country flying at Andover. This school will probably not be required before early in 1921. As soon as the cadets have passed this course they will be posted to a service squadron, as it is most important that they should join a unit which they can regard as their home, as the sailor does his ship or the soldier his regiment, as early as possible. Subsequently they will undergo a course in gunnery, without which no flying officer can be regarded as a service pilot. The gunnery school will be established at Eastchurch, but, as the bulk of our present pilots have war experience, will not be required in the next financial year. After five years' service, officers will be required to select the particular technical subject they will make their special study during their subsequent career, e.g., navigation, engines, wireless. Short and long courses will be provided in these subjects in order to cater both for the officer who wishes to continue primarily as a flying officer with a working knowledge of one or more technical subjects, and for those who wish to become really expert in a particular branch. Technical knowledge will, *inter alia*, qualify an officer for selection for high command.

The career of officers commissioned from the Universities or from the ranks—except in the case of boy mechanics receiving commissions, whose case will be dealt with later—will be identical with that of those from the cadet college, except that they will be taught to fly at a flying training wing before joining their squadrons. Short service and seconded officers will be taught to fly at training wings and will attend a course of aerial gunnery and probably one of air pilotage. In view of their short service, it is not proposed, save in special cases, to send them through the advanced technical courses. These officers will be eligible for promotion during their service in exactly the same way as the permanent officers. The technical schools required at once are those dealing with navigation, wireless, photography and engineering. Aerial navigation is practically a new science. An attempt has been made during the current year to work out the theoretical principles in practice at Andover, and considerable progress has been made, but it is obvious that the chief need of aerial navigation will arise when flying over the sea, where the map is of no service, and it is consequently proposed to reopen this school at Calshot in the spring of next year.

Schools of wireless and photography are now in existence at Flowerdown, near Winchester, and at Farnborough respectively, while it is proposed to commence an engineering course, at a suitable station, shortly after Christmas.

For the training of University candidates, short service and seconded officers and officers of the reserve or Territorial Force, it is estimated that seven training wings would eventually be required.

In view, however, of the fact that the short service list has been filled by officers who have already been trained as pilots during the War, it is only proposed to form two of these on a reduced basis during the next financial year to deal with the training of University candidates, a small number of reserve officers and of certain officers granted permanent commissions, with the proviso that they must learn to fly within 12 months.

In view of the exceptional facilities for training in Egypt, it is proposed to locate, at least, one of the training wings, together with branch schools of gunnery and air pilotage in that country, but whether it will be convenient to do so next year cannot yet be definitely foreseen.

One other most important school in connection with the training of the officer is essential, and it will probably be necessary to start it on a small scale in 1920. This is a school for flying instructors. The first school of this kind was started during the War at Gosport, and it is hardly too much to say that it revolutionised the art of flying. The science of flight was carefully analysed and the analysis practically applied to the problem of tuition with remarkable results. It is essential in future that all instructors in training wings and all officers of or above the rank of flight commander in service squadrons should have passed through this course. A liberal amount of dual control with a qualified instructor is one of the chief safeguards against the faulty flying which is the cause of the majority of accidents.

Although it is not proposed to open it during the next financial year, an Air Force Staff College must be formed as soon as possible. It is intended to establish this at Halton in the house of the late Mr. Alfred Rothschild, purchased by the Government at his death with the whole estate. The house and its surroundings are eminently suited for the purpose, and there is an aerodrome within a quarter of a mile.

**7. Training of men.**—The most difficult problem of all in the formation of this force is the training of the men. Demobilisation has removed most of our best mechanics, and the efficiency of the squadrons to be formed depends on the most thorough instruction of those who are to take their place. It has, therefore, been decided to enlist the bulk of those belonging to long apprenticeship trades as boys, who will undergo a course of three years' training before being passed into the ranks. With a preliminary training of the nature contemplated and the practice of their trade during their subsequent service, it is confidently anticipated that these mechanics on passing to civil life will have no difficulty in securing recognition as skilled tradesmen. This is an important consideration, since any tendency for the Air Force to be regarded as a blind alley occupation would be fatal.

The training of all these boys will eventually be carried out at Halton Park, where ample and well-equipped technical shops are already in existence. Pending the erection of permanent barracks to replace wooden war-time huts, use will also be made of Cranwell, in Lincolnshire. It has been necessary to speed up the training of some 5,000 boys enlisted during, and shortly after, the war, and the residue of these, some 3,000, will complete their training, at Halton. A scheme has been drawn out for the future enlistment of boys by means of a competitive examination, and local education authorities have been circularised with a view to their nominating suitable boys to sit for the examination. By this means it is hoped to secure a really high standard. The first entry under this scheme will take place early in 1920, and the boys will commence their training at Cranwell and will be moved to Halton as soon as the permanent accommodation is ready.

The boys, on successfully passing their final examination, will be graded as leading aircraftsmen, and a certain number will be specially selected for a further course of training, at the end of which they will either be granted commissions, or promoted to corporal. Those granted commissions will join the cadet college.

It is intended to enlist the remainder of the mechanics, of whom more than half will belong to short apprenticeship trades as men, and these will undergo 12 months training at Cranwell as soon as the boys have moved to Halton. Pending the move, it is proposed to carry out the training of these men at Eastchurch, which, as has already been said, will not be required in its eventual capacity as a gunnery school for another 12 months at least.

Non-technical men will be given a short course of recruit training at the depot at Uxbridge.

**8. Higher organisation at home.**—As regards higher organisation in the United Kingdom, all units working with the Navy

have lately been formed into one command, known as the Coastal Area Royal Air Force. The two remaining commands, now known as the Southern and Northern Areas, will, early in 1920, be amalgamated into one command to be known as the Inland Area. This cannot be done earlier owing to the very large amount of work entailed in closing up surplus stations, demobilising surplus personnel and generally clearing up the after-effects of the War.

**9. Depôts.**—Each of the two Areas in the United Kingdom will have its repair depot at Henlow for the Inland Area; and at Donibristle, near Rosyth, for the Coastal Area. During the next financial year it will be necessary to retain three of the existing stores depôts, but it may prove possible at a later date to reduce the number to two, though this is by no means certain.

It is hoped that eventually arrangements will be made for all Royal Air Force mechanical transport to be repaired at Slough, but in view of the arrears of work it will be necessary to retain for the present our own repair depot at Shrewsbury. Each overseas theatre will have a combined repair and store depot of a size suitable to the number of squadrons based upon it.

**10. Necessity for large capital outlay on accommodation.**—From the above outline of our proposals it will be seen that every endeavour is being made to reduce expenditure on personnel during 1920-21 to the minimum absolutely essential to create the framework of our future Air Force. This is necessary, if for no other reason, owing to the peculiar position in which the Royal Air Force is placed as regards permanent accommodation.

Though some of the wartime buildings can be made to serve for a year or two in their present state, the Air Force does not possess one single permanent barracks, and a large capital outlay on the provision of new buildings and the adaptation of the most suitable of the temporary buildings is inevitable during the first few years. This will be balanced to a certain extent during the next two years by the small requirements in technical equipments due to the large stock remaining over from the War. The principle followed has therefore been to exercise rigid economy at the outset over personnel and technical equipment in order to free as large a part as possible of the total sum provided towards the provision of barracks. As time goes on, the building services will absorb less, while the cost of technical equipment, and, to a lesser extent, of personnel, will increase, until eventually the works vote will be little in excess of the cost of maintenance.

It must be recognised, however, that the total cost of building will be large. The boys' barracks at Halton, for instance, with the necessary accessory buildings and the cadet college will no doubt be a heavy item. These are undoubtedly the two most expensive services, but the accommodation for personnel at the majority of our stations will have to be rebuilt or adapted at considerable cost. The outlay must, however, be faced, and it is undoubtedly wise to undertake the bulk of the work in the first few years, while the expense of other services can be kept down.

**11. Research.**—One matter of supreme importance has not yet been mentioned, namely, the provision to be made for research. The departments of Supply and Research are now being transferred from the Ministry of Munitions to the Air Ministry, and a portion of the experimental establishments are a charge on the Air Force votes. Steady and uninterrupted progress in research is vital to the efficiency of the Air Force, and to the development of aviation generally, and on it depends both the elimination of accidents and the retention of the leading position we have established at such heavy cost during the War.

The existing establishments must therefore be retained during the ensuing financial year at a sufficient strength to ensure that urgent work shall continue. Some of the work which was urgent under war conditions can, however, now be postponed until progress with the building programme liberates more money for other purposes. The principal aeroplane-research establishments are at Farnborough, Biggin Hill, Martlesham Heath and Grain, while airships' research will be undertaken at Cardington and Howden.

**12. Civil aviation.**—No allusion has been made to civil aviation in this paper, which has been confined to the Service aspect of the question.

H. M. TRENCHARD,  
Chief of the Air Staff.

AIR MINISTRY,

25th November, 1919.



**THE PERMANENT R.A.F.—continued.**  
**APPENDIX.**

	Existing or to be formed in 1920-21.	Increase during 1921-22 to.	Increase during 1922-23 to.
<b>I.—UNITED KINGDOM.</b>			
Striking Force .. .. .	2 Squadrons.	4 Squadrons.	No increase.
Training Wings .. .. .	2 Wings each of 3 Squadrons.	5 Wings.	6 Wings.
Co-operation with Army Divisions.	1 Squadron.	2 Squadrons.	No increase.
Co-operation with Fleet (Home Waters).	1 Squadron Reconnaissance and Artillery machines.	No increase.	No increase.
	1 Flight Ships' fighters.	1 Squadron Ships' fighters.	No increase.
	1 Squadron Torpedo machines.	1 Squadron Torpedo machines.	No increase.
	1 Flight Flying Boats.	1 Squadron Flying Boats.	2 Squadrons Flying Boats.
	1 Flight Float Seaplanes.	No increase.	No increase.
Communication Squadron.	1 Squadron.	No increase.	No increase.
Experimental Stations .. .	4 Stations for Aeroplanes, Seaplanes, Torpedo Machines and Wireless respectively.	4 Stations as before and trial ground for bombs and machine guns in addition.	No increase.
Schools and Training Centres ..	Cadet College. Navigation School. Flying Instructors' School. Administrative and Technical School for Officers. Wireless and Electrical Training School. School of Photography. School of Co-operation with Navy. School of Co-operation with Army. Balloon Training. Airship Training. Boys' Training Centre. Technical Men's Training Centre. R.A.F. Depot and Non-Technical Men's Training Centre.	As for 1920-21, and in addition School of Air Pilotage. School of Gunnery. (N.B.—The majority of the Schools will be on a reduced basis in 1921-21, and will gradually increase to full strength in the two succeeding years.)	As for 1921-22, substituting Staff College for Administrative and Technical School for Officers, and in addition Flying Officers' Training College (for the preliminary training of direct entry Officers).
Depôts .. .. .	2 Aeroplane Repair Depôts 1 M.T. Repair Depot. 3 Stores Depôts.	No increase. As for 1920-21 except that the M.T. Repair Depot will drop out as soon as the repair work for R.A.F. vehicles can be undertaken at Slough.	No increase. As for 1921-22.
Airships .. .. .	1 Station.	No increase.	No increase.
<b>II.—OVERSEAS.</b>			
India .. .. .	8 Squadrons. 1 Depot.	No increase.	No increase.
Egypt .. .. .	7 Squadrons. 1 Depot.	7 Squadrons. 1 Depot. 1 Training Wing.	7 Squadrons. 1 Depot. 1 Training Wing. 1 School of Air Pilotage. 1 School of Gunnery.
Mesopotamia .. .. .	3 Squadrons. 1 Depot.	No increase.	No increase.
Malta .. .. .	1 Flight Seaplanes.	1 Squadron Seaplanes.	No increase.
Alexandria .. .. .	1 Flight Seaplanes.	1 Squadron Seaplanes.	No increase.
Mediterranean .. .. .	1 Flight Float Seaplanes on Carrier.	No increase.	No increase.

## CIVIL AVIATION ABROAD.

The following synopsis of the progress of civil aviation in foreign countries up to 31st October, 1919, prepared by the Air Ministry, was issued as a White paper on Monday:—

### I. INTRODUCTION

In connection with the Command paper dated 1st November, entitled "Synopsis of Progress of Work in the Department of Civil Aviation," and also with the "Report of the Advisory Committee on Civil Aviation," dated 30th October, 1919, it is thought that it may be useful briefly to summarise the progress in civil aviation made by the more important foreign countries.

It should be borne in mind that, with the exception of Great Britain, no country has as yet a separate Air Ministry or a department corresponding to our Civil Aviation Department, and it has not been easy in the majority of instances clearly to distinguish Service operations from Civil enterprise.

Missions manned by Service personnel have been despatched by France and Italy to foreign countries in order to inculcate a taste for products which it is hoped may be difficult to eradicate, even if the goods subsequently offered by others may be superior. Aircraft and agents have been despatched by British firms to various parts of the globe, but hitherto no official foreign missions have been despatched by the British Government owing to:—

- a shortage of available Service personnel and a reluctance to confuse Civil and Service enterprise, and—
- the traditional British policy that an industry should be left to develop, as far as possible, on its merits.

### II. ALLIED AND ASSOCIATED POWERS

(a) **France.**—The French are fully alive to the possibilities of aviation, and are making every endeavour both to secure foreign markets and assist internal development. The control of civil aviation has been placed under a branch of the Department of Aviation, which is in itself directly under the Ministry of War.

With regard to civil aviation, the French have followed their usual policy for the encouragement of new industries, and have adopted the principle of subsidy. A sum of 18,000,000 francs out of a total of 37,000,000 francs voted for civil aviation this year has been earmarked for this purpose. The subsidies are paid subject to the proviso that the nationality of the enterprises so assisted is entirely French as to ownership, management, material used, and personnel employed. They take the following form:—

- Bonuses on distances flown (including flights by machines used for purely private purposes).
- Bonuses to pilots and crew for good work.
- Premium on tonnage carried.
- Special bonus up to 25 per cent. per annum of the total value of machines of military type immediately available in emergency for use by the State.

Various contracts for carrying mails have been granted, and an agreement has been signed with the British General Post Office for the transport of mails by air between England and France. The principal mail routes in operation are:—

Paris—London (in conjunction with a British firm).  
Paris—Lille—Brussels.  
Toulouse—Rabat.

Various other internal civil aviation routes in respect of which mail contracts have not as yet been granted are in operation, and an ambitious programme of projected routes is under preparation.

In the Near East, France is neglecting no effort to achieve aerial predominance, and military machines have been carrying civil mails on the following routes:—

Athens—Salonika (weekly service).  
Constantinople—Salonika (irregular).  
Constantinople—Bukarest (bi-weekly).  
Bukarest—Galatz—Kichenel (irregular).

These routes were primarily military communications, but are gradually assuming the character of civil aerial mail services.

Apart from the Near East, energetic pioneer work is being carried out in Spain and Czechoslovakia. Missions have been despatched to the Argentine and Japan. In the case of the former, it is estimated that the cost will amount to 100,000 francs, but this can hardly include the cost of the machines, which will presumably be allotted free, nor that of transport. In Japan, the French have established themselves firmly and are at present engaged in instructing Japanese officers. Amongst other missions contemplated the principal are those to Brazil, China, Finland, Greece, Peru, Poland, Roumania, Siberia, Switzerland and Turkey.

The most important Transport Companies are:—The Compagnie de Messageries Aériennes, which is working in conjunction with Messrs. Handley-Page; the Compagnie Générale Trans-Aérienne, working in conjunction with Aircraft Transport and Travel Co.; the Compagnie de Navigation Aérienne; and the Farman Company. Of these, the first-named is a combination of various activities under the direction of M. Breguet. There are signs that, in order the better to meet foreign competition, endeavours are being made to bring certain of the more important firms into large working combines. The first two mentioned above have contracts for running mails, and it is probable that the third will also receive a contract.

With regard to airships, it is understood that the present policy is for the Government to supply the material for a commercial airship service, the running of which will be carried out by a company under guarantee of a fixed minimum dividend.

Contracts have been invited and tenders have already been received for the construction of four rigid airships of approximately 3,000,000 cub. ft. capacity, and for the erection of sheds at Paris, Marseilles and in Africa.

The airship line or route contemplated will probably be Paris-Marseilles and from Marseilles to Africa, and later to South America, via Dakar.

It is understood that a sum sufficiently large to ensure the carrying out of this programme has already been voted.

(b) **Italy.**—Aviation in Italy is divided into three separate organisations—Military, Naval and Civil. Military aviation is attached to the War Office, Naval aviation to the Admiralty, and Civil aviation to the Ministry of Transport. Schemes for the organisation of internal routes have been drawn up, but, owing to the present financial strain, have not yet been put into effect. By a series of long demonstration flights, by the despatch of missions to—

The Argentine,  
Brazil,  
Ecuador,  
Spain,  
Scandinavian countries,

and by the gift of machines to various countries, Italy is endeavouring to press her aircraft products and to obtain a footing in the countries concerned.

Among recent notable performances was a non-stop flight by a flying boat from Italy to Amsterdam, while a similar machine was the only competitor which succeeded in completing the course of the Schneider Cup competition in England. It is also intended shortly to despatch a flight of machines from Italy to Japan.

Efforts are being made to form a combine to strengthen the position of the aircraft industry, and several of the larger firms, such as Caproni, F.I.A.T., and Iota-Fraschini have already joined.

The airship M. 1 has been handed over to the Department of Civil Aviation, and is being flown by service personnel for propaganda purposes from Rome to Naples. By means of a false deck fitted above the car the vessel is able to carry about 12 passengers.

A semi-rigid airship of about 1,100,000 cub. ft. capacity, now under construction for the use of civil aviation, should be ready for trials shortly. In this vessel it is believed that the Italians intend to attempt a flight from Italy to Rio de Janeiro.

(c) **U.S.A.**—An important part was played by American firms in the production of aircraft and accessories during the war, but the majority of those thus engaged have now diverted their activities to other directions.

Separate air services are maintained for Army, Navy, and Post Office. From the reduction of the Army and Navy air estimates to \$25,000,000 each, it may be necessary for the military and naval flying services to amalgamate.

A sum of \$300,000 was allotted to the Post Office in December, 1918, for the inauguration of postal services, and a further \$8,600,000 have now been requested in order to start services between New York and Omaha, and Boston and Atlantic City. An aerial route between Atlantic City and Chicago is also contemplated.

Civil aviation is not yet under the control of one centralised office, but it is understood that a Bill for the purpose of setting up an Air Department for the co-ordination of all air matters is under consideration. There has as yet been no great activity in the formation of private companies for the exploitation of civil aviation.

No system of direct Government subsidies appears to have been established other than by the gifts of military aircraft.

The Post Office Department is conducting an aerial mail service between New York and Washington, and New York and Chicago. The former of these two routes was inaugurated by the War Department in co-operation with the Post Office. The cost of maintenance and responsibility for operating were later transferred to the Post Office. It is understood that both these services have been equipped with aircraft given free of charge by the Army. The Assistant Postmaster-General has recently left for Cuba with a view to examining the possibilities of opening up a flying boat service between Key West and the West Indies. In California a system of forest fire patrols run by Government machines has been established.

The military aeroplane service is surveying aerial routes throughout the United States in order to ascertain the most suitable positions for landing grounds and emergency landing grounds.

Hitherto the United States have embarked on no foreign missions. A seaplane base, however, is being laid out at Rio de Janeiro, with the assistance of American engineers, and an unofficial mission is operating in Scandinavia.

Negotiations have been completed with the British Government for the purchase of the rigid airship, R.38, now under construction at Bedford. The British Government has agreed to train U.S. Airship personnel, and a party of officers and men will proceed to England for this purpose.

A contract has been placed for the erection of an airship shed at Lakehurst, New Jersey. The dimensions are 800 ft. x 265 ft. x 174 ft. (high), and it is estimated that the shed will hold two 5,000,000 cub. ft. airships. A helium production plant is also being constructed at Fort Worth, Texas, but particulars as to output, etc., are not available.

(d) **Belgium.**—Owing to more urgent reconstruction measures Belgium has not yet had sufficient time to develop civil aviation. Although handicapped financially, an efficient Army Flying Corps is in existence, and steps are being taken to organise civil aviation as a department of the Ministry of War. The duties of this department, which are wide, will in the first instance lie mainly in the application of the International Conventions and rules. It will also be responsible for the general organisation and control of aerial navigation within Belgium. Special attention is to be paid to the control of aerial work, infringement of the regulations being punishable by terms of imprisonment varying from eight days to one year, and by a fine of 50 to 5,000 francs. It is laid down that all aircraft must be registered, and that such registration confers Belgian nationality.

It is to be noted that the present provisions governing import and export of goods by land and sea will also apply to the import and export of goods by air.

A consultative committee, including representatives of military and civil aviation and of the ministries and legislative chambers concerned has been set up under the head of the air department to deal with all problems that may arise.

A powerful company, to be known as the National Syndicate, is being formed to encourage civil aerial transport. Several important motor-car manufacturers are interested in the company, and foreign capital will not be admitted above a limit of 25 per cent.

Aeroplane construction is also receiving serious attention, but it is realised that neither France nor Great Britain are likely to purchase Belgian products. The erection of an aircraft factory in Belgium by a foreign firm would not be encouraged.

(e) **Japan.**—Japan has not as yet made great progress in aviation either Service or Civil. No machines are manufactured nor is she inclined to purchase modern aircraft from abroad. It is probable that when once certain types have been decided upon she will build from these original models rather than make extensive purchases of foreign machines.

An important French mission reached Japan shortly after the Armistice, and although the majority of the officers and personnel returned to France in September, a few have remained in Japan to supervise the organisation and training of the Japanese Flying Corps.

The establishment of an aerial postal service between Tokyo and Osaka is under consideration, and experimental flights between these two towns are shortly to be undertaken by Japanese personnel.

(f) **Rumania.**—Civil aviation, as such, is not yet existent in Rumania, but the French are showing enterprise, and it is important for British manufacturers to make a bid both for military and civil orders. From recent information received it would appear that efforts in this direction would be sympathetically met.

Throughout Rumania railway and road communications are bad; sites suitable for aerodromes are, however, numerous, and, as a means of transport, civil aviation should have a distinct future.

(g) **Greece.**—Owing to its position on the way to the East, Greece is an important strategic air point. No definite proposals have yet been put forward for the development of civil aviation in this country. France, however, is active, and proposals have been made for the establishment of an aerial mail service between Smyrna and Athens.

At the present moment a British mission is responsible for the training of the Greek Naval Air Service and a French mission for the training of the land service.

An important base is being constructed at Phalerum, which is to be used as a general supply and training station for both sea and land pilots.

(h) **China.**—China, with her vast spaces and lack of means of communications, offers a wide field for the development of aviation. A request has recently been received from the Chinese Government for the assistance of a British aeronautical adviser, and it is hoped that the appointment of this official will assist British aviation.

Certain concessions have already been obtained by British firms in China, Messrs. Vickers having recently floated a loan of £1,800,000 for the development of aviation. At the moment, however, there cannot be said to be any national flying.

### III. ENEMY COUNTRIES

(a) **Germany.**—Of late enemy countries by far the most serious competitor is Germany.

Partly to avoid the terms of the Peace Treaty, and partly to make an early bid for foreign markets, large numbers of aeroplanes and aeroplane engines have been sold at extremely low figures to Norway, Sweden, Holland, Denmark, and Switzerland, and there can be no doubt that Germany has secured a substantial footing, so far at least as the aeroplane is concerned, in neighbouring countries.

In her present endeavour to develop civilian aircraft, both airships and aeroplanes, Germany is apparently of the opinion that the leading commercial power in the air will have the strongest reserve air force in the event of war, and Herr Euler, the President of the Imperial Air Board, has stated that the Government intend boldly to foster civil aviation.

Hitherto, no definite policy has emerged, but certain aerial mail contracts have been granted, and all Post Offices in Berlin accept aerial letters for:—

Berlin	Leipzig	Dortmund
Munich	Weimar	Gelsenkirchen
Vienna	Hamburg	Duisburg
Dresden	Hanover	

to which towns aerial mails are in operation. A fee of 1 mark per 20 grammes (about  $\frac{1}{2}$  oz.) over and above the ordinary internal letter rate is charged.

Several passenger services have been operated more or less regularly, although it is understood that flying has had to be suspended temporarily owing to shortage of petrol. An airship service is carried out on alternate days between Berlin and Friedrichshafen (about 400 miles), for which 600 marks per passenger is charged; and it is hoped shortly to inaugurate airship routes between Berlin—Copenhagen—Christiania—Berlin and Stockholm. The Hamburg-Amerika line is particularly interested in this new means of transport, and it is believed to have ordered one or more large airships.

The following civil aerial policy is foreshadowed:—

(i) That at first Government assistance in the shape of subsidies will be necessary.

(ii) That existing aerodromes and material will be retained, and privately owned aerodromes acquired by the State, thus forming a strong nucleus for civil aviation under Government support and control.

(iii) That a combine will be formed of all firms for working purposes, each firm to standardise a type, and all types to be approved by the Government.

(iv) That there will be co-operation between military and civil services.

(v) That propaganda will be employed especially in the State schools.

A number of influential companies have been formed, notably the Flugsverkehraktiengesellschaft, which will run six regular services from Cologne to Munich, Stuttgart, Basle, Hamburg, Berlin and Breslau; the Deutsche Luftreederei, which works in conjunction with the Zeppelin Company and the Hamburg-Amerika line. The Bavarian Luft-Lloyd and the Saechsische Luftreederei are also new companies now operating.

Police patrols have been in existence for some time, and a network of these patrols is to be established throughout the country.

In order to keep in touch with ex-service men, an Airmen's Union has been formed, with branches at Baden, Mannheim, Karlsruhe, Frankfurt and other centres; and a German Air Fleet Union, somewhat similar to the German Navy League, has been formed with the object of fostering national interest in aviation.

(b) **Austria, Hungary, Bulgaria and Turkey.**—Owing to internal conditions and the uncertainty of the future, little has been reported as being done in Austria, Hungary, Bulgaria or Turkey towards the advancement of aviation, and it is unlikely that there will be any great progress in aviation in any of these countries for some time.

In connection with military operations, the Italians have been running a regular service to Vienna, and various attempts have been made by Austrians to interest foreign countries in the development of aviation in their country.

Bulgaria, it is understood, like Germany, is anxious to maintain an aerial police service equipped with military machines, ostensibly for the purpose of preserving internal order, and to form a nucleus for civil aviation.

Turkey is still under the occupation of the Allies, and, except for mail services which are being carried out by French military machines from Constantinople to Salonika, no attempt has yet been made by the Turks to establish aviation on a definite basis.

### IV. NEUTRAL STATES

(a) **Holland.**—Germany has neglected no opportunity to obtain a footing in the Dutch aeroplane trade.

Partly owing to Herr Fokker's efforts, and partly to the fact that the sympathies of a proportion of Dutch merchants are pro-German, it is probable that British products may have difficulty in competing.

There is as yet no Dutch national civil aviation, and, owing to the comparatively short distances to be covered, it is impossible that it will be extensively developed internally. It would appear rather that Holland is desirous of becoming an air junction for machines bound further afield. Aerodromes, however, are as yet few, and, as a whole, the country is more suited to flying boats than to aeroplanes.

An agreement, similar to that in force with France, has, however, recently been signed by the British and Dutch Governments for the establishment of an aerial mail between the two countries, and it is hoped that the service will shortly be instituted.

The purchase of flying boats for use in the Dutch East Indies is in contemplation for the linking up of other air routes with those islands, and an important company has been floated under the title of the Royal Air Transport Company for the development of aviation in the Netherlands and her colonies.

(b) **Spain.**—Civil aviation is as yet undeveloped in Spain, but good results have been obtained from the enterprise displayed by the British aircraft industry in sending machines to that country and from the visit of a detachment of R.A.F. machines in May.

It is understood that the Spanish authorities are eliminating all aeroplanes of old types from the Flying Corps and that this Service is to be re-equipped. The Naval Air Service is also being organised. It is understood that a British type of machine is to be adopted for instructional purposes.

Here again foreign competition is extremely keen, and both the French and Italians are making every effort to secure the Spanish market. Both countries had the advantage of being first in the field with military machines.

A decree has recently been signed by the King, authorising the establishment of an aerial postal service for linking up the Spanish possessions in Africa



and the Balearic Isles with the mainland. So far as is known, no definite steps have yet been taken for putting the project into practice, the proposal being mainly for experimental work.

Permission has been granted to the French for the establishment of a route between Toulouse and Rabat via Barcelona and other Spanish towns. This route was originally utilised for the purpose of the delivery of French military machines to Morocco, but it is now developing into a civil mail route.

(c) **Norway, Sweden and Denmark.**—No opportunity has been lost by the Germans to strengthen the geographical and other ties that exist between Germany and Norway, Sweden and Denmark; and by propaganda and the flooding of the countries with goods sold at very low prices, the German aircraft industry has already secured a strong position.

All three countries are anxious to develop aviation, and a considerable amount of interest was aroused by the visit during the summer of British flying boats to Scandinavian waters. The opinion was generally expressed that the large British flying boat was too expensive and that a smaller single engined machine was more likely to secure a market.

The three Scandinavian countries and Finland have formed a Northern Aerial League. A conference of this League has been summoned to meet at Stockholm to consider certain proposals by the British Air Ministry, which ultimately may result in the adoption by these countries of the International Air Convention.

(d) **Switzerland.**—Owing to the restrictions placed on aviation in Switzerland during the war, when flying was confined to certain definite areas, little progress has been made during the last five years. There is, however, keen appreciation of the possibilities of aviation, and since the termination of the war, service pilots and machines have been freely used on work of an educational nature and the running of experimental postal services.

From the configuration of the country the development of the aeroplane is perhaps limited, but there are large possibilities before flying boats, and the Swiss are anxious to see this type of craft introduced, both for purposes of communication and tourist traffic.

The Swiss tendency is to develop internally rather than to welcome foreign construction, but for the time being, and until her own resources have been developed, she is prepared to welcome foreign aircraft. At present German influence predominates both in design and organization. In conjunction with a British firm an instructional school has been started in Lausanne.

The aerodromes already in existence are small, except that at Dubendorf, near Zürich.

Switzerland hopes to become the main route for machines bound for Italy and the East, and plans are under consideration for the construction of important air-stations near Geneva and Thun.

(e) **South American States.**—The South American States, with their large rivers, undeveloped communications, and great distances, combined

with prosperous conditions, offer favourable markets for aircraft. Both France and Italy have dispatched missions of a military character to various of the States, and other missions are projected. Signs are not wanting that the United States will also endeavour to obtain a footing in this quarter. Individual machines and agents have been dispatched by British firms, and a certain headway has been made. Important concessions have been granted to British firms, including in one case the provision of land for the erection of aerodrome stations.

Brazil has recently voted a credit of 500,000 francs to cover the expenses of a projected air mail service, and to provide for the formation of a bombing and reconnaissance squadron.

## V. CONCLUSION

To sum up, it would appear that Great Britain's most serious competitors in securing an international aircraft trade are France, Italy, and Germany. Neutral countries, although generally benefiting financially, did not share in the impetus given by the war to aviation, and have on the whole made little progress in that science. Nevertheless, on the whole, compared with that made by other countries, British progress has been considerable.

Meanwhile, from experience gained, the following points may be noted:— Missions to foreign countries of a civil character both as to personnel and machines may still prove of value. The cost in equipment and personnel of such expeditions, is, however, large.

Propaganda is of prime necessity both at home and abroad. Apart from missions, one of the best methods of carrying it out abroad is by carefully planned and executed "demonstration" flights. There is no doubt, for instance, that the successful flight of the Atlantic both by aeroplane and airship largely increased the prestige of British aircraft. Isolated action is unlikely to be as fruitful in result as that of combined action by a number of firms.

It would appear that as Commercial Attachés are requisite for assisting British trade in foreign countries, so are Air representatives of great utility in the same way. Hitherto, in order to effect economy Service Air Attachés have combined in their own persons the duties of Service and Civil work. This plan has not always proved a success from the civil point of view, since regular officers do not necessarily possess the requisite qualities. In any case the posts of Service Air Attaché are very few in number. In instances where the Service Air Attaché has had commercial experience excellent results have been obtained.

On occasions it may be possible for Commercial Attachés to assist in aviation matters in addition to their normal duties, but it must be remembered that considerable technical knowledge is essential and that those representing the Air should have flown themselves, and to report not only on the progress of aviation in the country to which they are accredited, but also to advise on the type of machine most fitted for use in that country.

## THE McCUDDEN MEMORIAL

SOME months ago a few friends of the late Major J. T. B. McCudden, V.C., and of his two brothers, William McCudden and Anthony McCudden, who were also killed while flying in the King's Service, decided to get together a small fund with which to erect a memorial to the three brothers. It is the wish of their father and mother that this memorial shall be set up at Chatham, where all three were born.

The following subscriptions have already been received:—

Lord Weir of Eastwood, £10 10s.; Air Marshal Sir H. M. Trenchard, Bart., K.C.B., D.S.O., £2 2s.; Maj.-Gen. Sir F. M. Sykes, G.B.E., K.C.B., C.M.G., £2 2s.; Air Commodore H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., A.F.C., £5; Air Commodore P. W. Game, C.B., D.S.O., £1 1s.; Air Commodore C. A. H. Longcroft, C.M.G., D.S.O., A.F.C., £1 1s.; Wing Com. R. G. Blomfield, D.S.O., £4 4s.; Wing Com. L. W. Rees, V.C., O.B.E., M.C., A.F.C., £2 2s.; "Five Years in the R.F.C.," £3 3s.; The Sopwith Aviation Co., Ltd., £2 2s.; Martinsyde, Ltd., £2 2s.; C. G. Grey, £2 2s.; Major C. C. Turner, £2 2s.; Stanley Spooner, £2 2s.; Capt. P. D. Acland, £2 2s.; Major E. L. Gilchrist, M.C., D.F.C., £2 2s.; Mrs. Rhys Davids, £2 2s.; Capt. G. J. C. Maxwell, M.C., D.F.C., A.F.C., £2 2s.; Capt. T. B. Marson, £2 2s.; Capt. Doyle, D.F.C., £2 2s.; Capt. Leighton, M.C., £2 2s.; Capt. G. W. Roberts, M.C., £1 1s. Total, £57 4s.

This amount is in itself sufficient for the proposed memorial at Chatham, but it is thought by those responsible for the

fund that many more friends of the McCudden family would like to subscribe, and that very probably a number of admirers of the work of these young men who died for King and Country would like to add to the amount though they did not know them personally.

Also, as far as is known, there is no other instance of three brothers being killed as pilots, and so there is good reason why all those who are concerned with flying should contribute to a memorial to a family which has made a greater sacrifice than any other in winning for this country the Command of the Air.

If the response to this appeal is as great as it should be, it is proposed that after erecting the memorial at Chatham the balance of the fund shall be devoted to endowing another form of memorial which will be of direct use to those who fly in years to come. This might take the form of a McCudden Memorial Bed at the R.A.F. Hospital, or a McCudden Memorial Scholarship in Aeronautics at one of the Universities, according to the wishes of the majority of the subscribers.

It is hoped that a large number of the officers who served with either of the three McCudden brothers, and a still larger number of those who know them only by reason of their deeds, will subscribe to the fund. Subscriptions, which are limited to a maximum of £2 2s., should be sent to Capt. Gerald C. Maxwell, M.C., D.F.C., at Room 663, Air Ministry, Kingsway, W.C.2.

## PERSONALS

### Deaths

Sec. Lieut. WILLIAM HENRY LOFFILL HALFORD, R.A.F. who was reported missing on September 28, 1918, and is now presumed to have been killed on that date, was the younger son of Charles Henry Halford, of Deodora, Harriets-ham, Kent.

### Married

Capt. J. R. HOWETT, R.A.F., younger son of Mr. and Mrs. R. Howett, of Market Harborough, was married on December 10 at the Catholic Church, Farnborough, to HILDA MAY, youngest daughter of Mr. and Mrs. W. A. ALDRICH, Woolwich.

Lieut. FRANK ALEXANDER URQUHART, R.A.F., of Edmonton, Alberta, was married on December 10 at St. Ann's, Aigburth, to GERALDINE LUCY MILNE, elder daughter of Col. G. Adshead WILSON, V.D., and Mrs. Wilson, of Aigburth, Liverpool.

### Items

GEN. SEELY was unanimously elected an Alderman of the Isle of Wight County Council last week.

DAME HELEN GWYNNE-VAUGHAN, late Commandant of the W.R.A.F., is a candidate for the Chair of Botany in the University of Aberdeen, where she was examiner in botany for four years before becoming Chief Controller of the Q.M.A.A.C. in France.

The first annual dinner of the 100th Squadron, R.A.F., will be held at the Holborn Restaurant, London, for officers on January 3, 1920, at 7 p.m.; for W.Os., N.C.Os. and men on December 31, 1919, at 6.30. All members who can attend please write at once to Capt. C. Gordon-Burge, Dent-de-Lion, Westgate-on-Sea, Kent.

# TRANSATLANTIC VICKERS-VIMY AT SOUTH KENSINGTON

On Monday last the new Aeronautics Section of the Science Museum at South Kensington was inaugurated with the formal presentation to the nation by the Vickers and Rolls-Royce firms of the Vickers-Vimy-Rolls machine, on which Captain Sir John Alcock flew across the Atlantic.

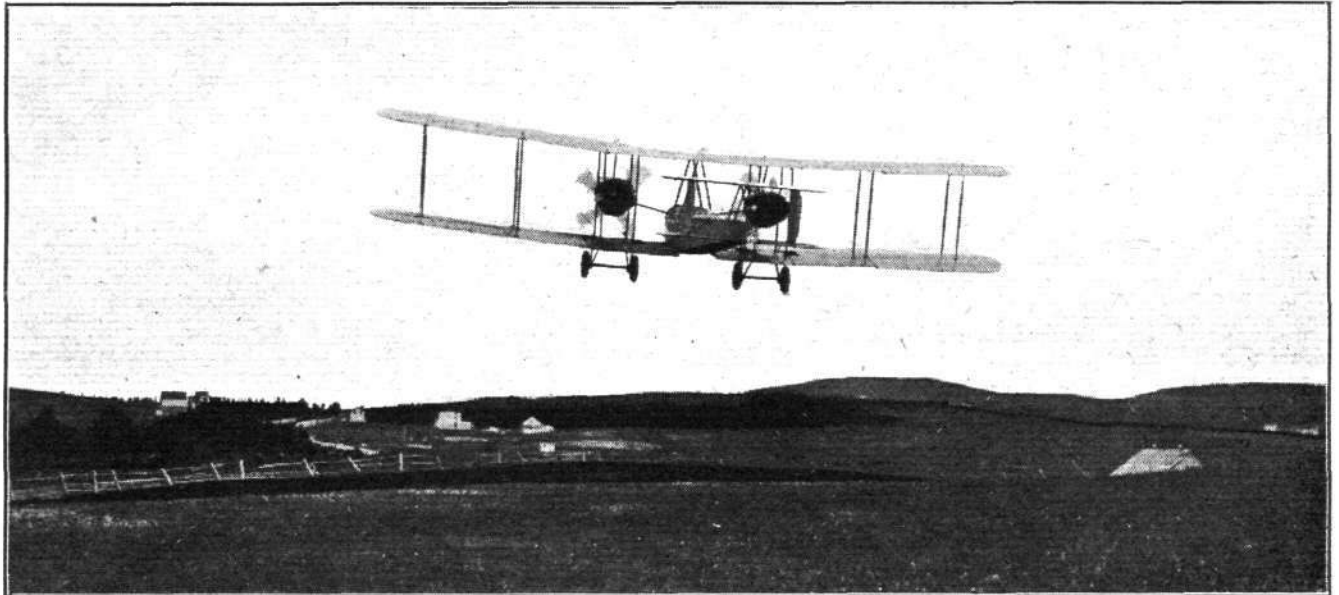
Dr. F. G. Ogilvie, Director of the Science Museum, presided, in the absence of the President of the Board of Education.

Sir Richard Glazebrook, representing Sir Hugh Bell, Chairman of the Advisory Council, congratulated Messrs. Vickers upon the fact of the Atlantic flight and also on Captain Ross-Smith's successful flight to Australia. He pointed out that the object of the exhibition was not merely to get together a collection of historical models, but, further, to show how science could help industry and commerce in the

be carried to Australia within a week; that would really be a most astonishing first product of war.

Mr. Claude Johnson said the engines were designed by Mr. Royce, engineer and chief designer to Messrs. Rolls-Royce, Ltd. A book had been got together containing memoranda on design by Mr. Royce and his designers, and it was known familiarly as the "Rolls-Royce Bible." A copy of it was given to every engineer who entered the works. It showed the tremendous amount of thought it was necessary to give to the subject in order to arrive at a successful engine. He hoped a monument would be erected to commemorate the flight, and that it would be placed, not in the wilds of the west of Ireland, but in London.

In accepting the aeroplane on behalf of the nation, Dr



The historical start from Newfoundland of the Vickers Vimy-Rolls machine for the Atlantic crossing!

future. It was gratifying to know that the Government were seriously taking up the question of research.

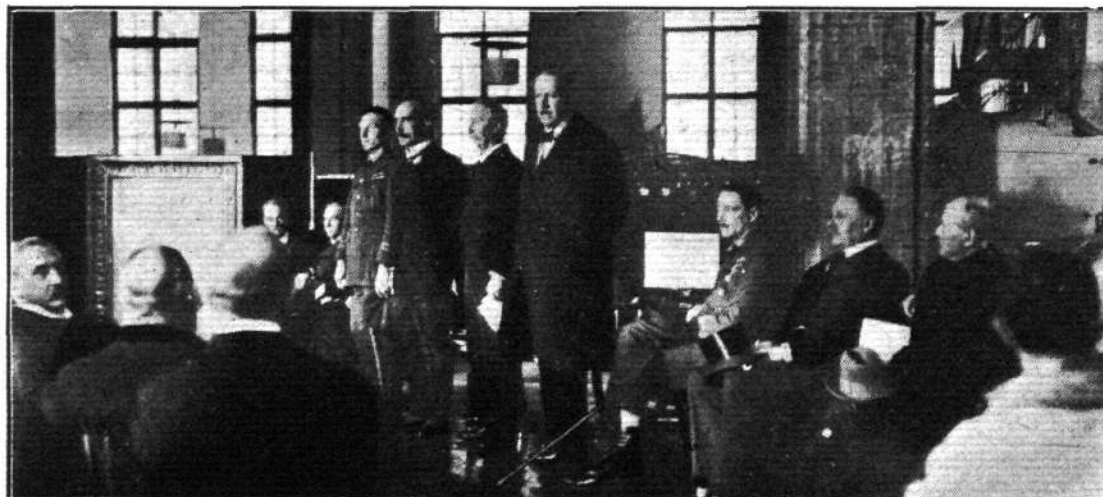
On behalf of Messrs. Vickers, Mr. Douglas Vickers said that the machine would form an historical landmark. It was not in any sense a special machine, but only one of a large number designed during the War for the bombing of Berlin. They were not ready until the last month of the War. In crossing the Atlantic it carried a certain number of special navigating instruments and a special petrol tank. With those exceptions, it was practically a war machine built twelve months ago. It had had to be slightly repaired, because it landed in an Irish bog, and had to be dragged out. The curio-hunter was there and made booty of certain portions of the machine—so that that was not the only place where relics of the Atlantic machine would be shown. Perhaps the flight to Australia was greater than the Atlantic achievement. It showed that, with relays of machines, letters might

Ogilvie said that he had received a message from the Prince of Wales, who hoped to see it at an early date.

Apart from this centre-piece there are already many interesting exhibits on view. They include a replica of Montgolfier's balloon of 1783, two models of the early Wright machines, and one of Stringfellow's, and a set of model Sopwith aeroplanes. There is also to be seen Mr. McEvoy's portrait of Sir John Alcock, a wind channel which demonstrates how lift is obtained by the movement of air beneath the aeroplane, and several Zeppelin relics.

Mr. Douglas Vickers later presided at a luncheon given at the Hyde Park Hotel by Messrs. Vickers, Ltd.

Mr. Fisher, High Commissioner for Australia, responding to the toast of "The Closer Bond Between the Mother Country and Australia," said that Captain Ross-Smith's machine would never return to this country; it would be kept in Australia.



The Atlantic Flight: Presentation of the Vickers Vimy-Rolls-Royce aeroplane to the nation. At the ceremony at the Science Museum, South Kensington, on December 15. On the platform, from the left, are Sir Richard Glazebrook, Sir Robert E. Cooper, Mr. Andrew Fisher, Sir John Alcock, Mr. Douglas Vickers, Dr. F. G. Ogilvie (Museum Curator), Mr. Claude Johnson, Air-Marshal Salmond, Col. Lyons, Mr. W. Longridge

"Flight" Copyright.





If there is one world-fact outstanding more than another this week it is the accomplishment of the flight from London to Australia—"Hands across the Sea" with a vengeance.

Of absorbing interest also is the story of the journey as told in Capt. Ross Smith's diary. It is an historical document, the original MSS. of which should be treasured in his native country equally with the actual machine, which Messrs. Vickers, Ltd., have agreed with the Australian Government, should be held by them as a milestone in linking up the farthest unit of the Great British Empire with the parent country. So mote it be.

CAPT. ROSS SMITH naturally would not seek to repeat the journey under similar conditions, and endorses the only feasible system under which the various limbs of the Empire can be kept in easy physical touch with each other through the air, viz., by relays of machines and pilots for definite stages of the journey. Irrespective of the speeding up and comfort thus assured, one solid reason is sufficient to emphasise this form of organisation. In passing through different climates with great variations of heat and cold, much strain and very heavy labour were caused as they expanded or

contracted in adjusting the stays and parts of the machine. Another milestone in aviation. This time a very big double terminus one.

THE Predominant Partner and Lord Fisher. "Somewhere about 600 years before the Christian Era, Baruch (a friend of Jeremiah) made this caustic remark," writes the Admiral:

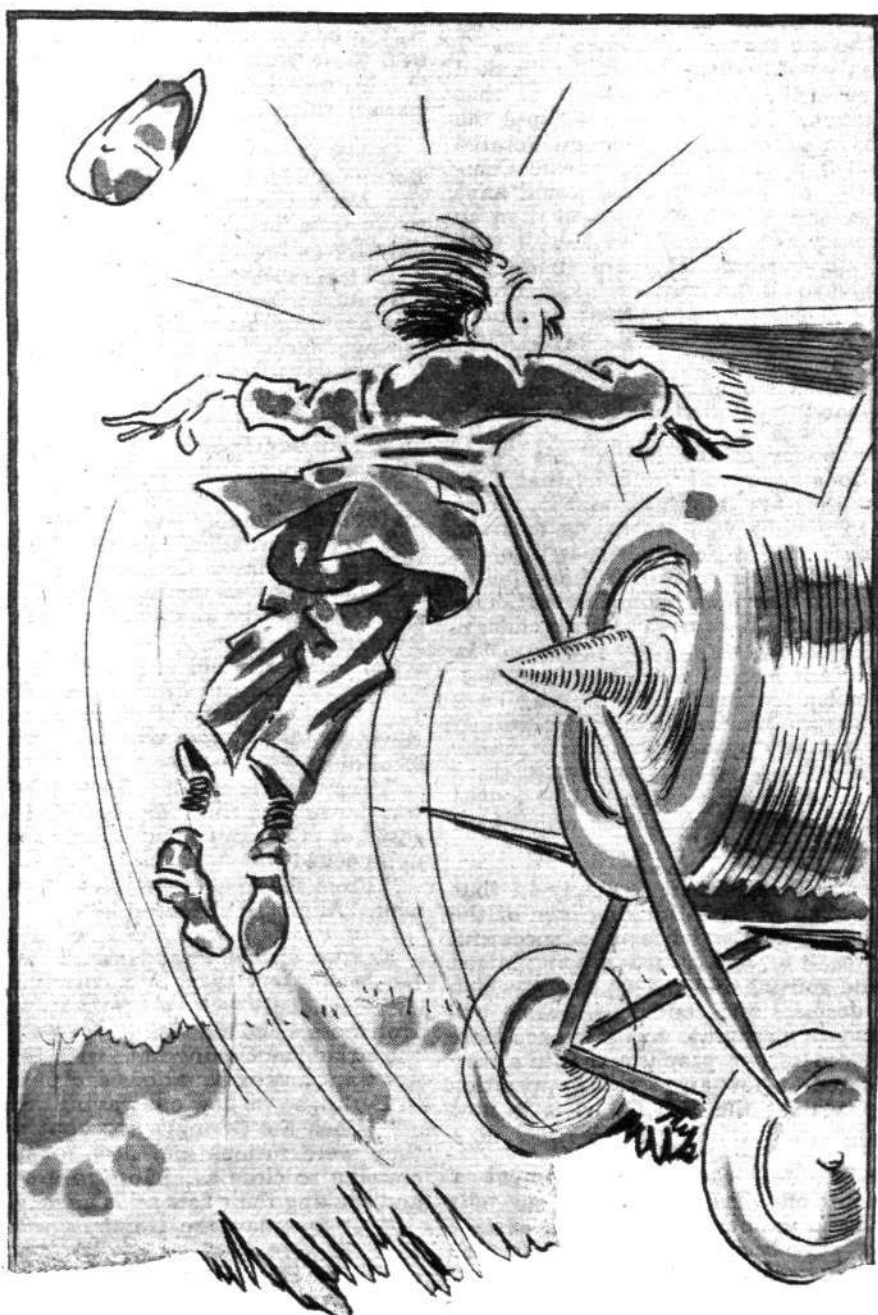
"Give not the things that are profitable unto thee to a strange nation."

"So, though daily receiving the 'pin-pricks'—'Why don't I describe in detail the future Air Navy and the future submersible Navy?'—I refrain for Baruch's reason—but really almost any fool could make the plans—they are so idiotically simple! This is the beauty of the future war. No mountains, rivers, protected harbours, no snow-bound Alpine passes are in the business—you just fly above all these things and drop your multiple ton bomb! Selah!

"But isn't it funny?—"

"Just when the air is clearly the predominant partner—Seely is sacked!—and the '400-million-a-year' War Office and the '158-million-a-year' Admiralty, instead of being subservient and squashed, trample on Seely and Co.

"There will be types in the air, as there were types on the



**MOST ANNOYING!—IV. To do a good turn for a pilot and get in the way of the "prop."**

water—the destroyers swifter than eagles (175 miles an hour guaranteed), the equivalent battle-cruiser with peculiar armour (but that's another story), and the lethargic bomb-carriers.

“As usual, the experts will say I am mad.

“N.B.—The Royal Society said the man was mad who predicted aeroplanes.”

This is Lord Fisher's last shot at the end of his letter.

THANK goodness the Realm of the Air has so far-seeing and powerful a champion as Admiral Fisher, second only to Sir Percy Scott. Both carry much weight with the people (and, after all, it is they who have to pay)—and they are so persistent, that there is hope for our Air policy before it is too late. A very good start has been made with General Sir Hugh Trenchard's scheme for the organisation of the R.A.F., and there is abundant matter for reflection and congratulation in the debate which has this week taken place in Parliament. In the meantime, Sir Percy Scott does not spare the Admiralty in his criticism of their obsolete methods, when advocating more generous consideration for aircraft. In his most recent utterance he lays down that “it has no appreciation of the value of time, it has always been opposed to change and reform, it is hidebound with routine and red-tapeism, and has no time to think of the needs of the future and how they should be met.

“I will quote a small example,” he writes. “When I was in charge of the Defence of London I wanted some guns; I knew that Lord Kitchener had some that he could spare; so I went over to the War Office and asked him for some; he said that he thought I could have them, but would let me know for certain in half an hour. In a quarter of an hour he telephoned to me that I could have them. I thought that it would be only polite if the Admiralty thanked him, so I sent a chit down to the Secretary submitting that such a course might be taken. In a commercial house the secretary would have called in a shorthand writer and dictated to him: ‘I am commanded by their Lordships the Commissioners of the Admiralty, to thank, etc.’ he would have signed it, and Lord Kitchener would have received it in an hour. How did the Secretary deal with it? He dealt with it according to the Admiralty custom. My request was put in a docket and passed round to all the Lords of the Admiralty and most of the heads of Departments for their opinions; it was marked ‘Immediate,’ so it only took six days. Here was waste of time and labour, and we were at war. As this is a fair sample of how business is done at the Admiralty, no wonder Mr. Walter Long found the staff tired.”

“As regards the future policy of the Navy,” Sir Percy continues, “Mr. Walter Long practically tells us that they have not got one, but that they are thinking about it. This will be poor consolation to parents who are trying to make up their minds whether they should put their sons into the Navy or not.” Coming to Sir Percy Scott's next point, we are afraid we disagree with his views upon this particular detail entirely. He rightly thinks there must be great changes in the future Navy, and he follows this up by saying: “In my opinion its most important arm of offence and defence, the aeroplane, has been taken from it; we are going back to the customs of 100 years ago, when we had our ships worked by sailors, but the guns manned by artillerymen from the shore. Now we shall have our aeroplane-carrying ships worked by sailors, but the planes they carry will be fought by members of the Royal Air Service; a scheme which I do not think will ever work satisfactorily.”

We may be wrong, but we shall be in company in that respect with a very big section of hard-thinking men of the new school. All this jibbing at the basis of a successful Air Service is merely the result of, in a measure, being bitten with the very “hide-bound routine and red-tapeism” which Sir Percy so thoroughly despises and condemns. Time will tell, and as the Air Ministry as a separate entity is once more and we hope finally disposed of, we prophesy that in a very few years it will be wondered at how any serious opposition could have been put up against the R.A.F., as it is now conceived.

CARRYING his arguments for aircraft development a step further, Sir Percy points out that Mr. Walter Long tells us that there are two sides to the question as to the surface battleship being dead, in part because of attack from the air. One side, says Mr. Long, is that aircraft will destroy the big battleships by dropping bombs on them; the other that they will not be able to do this, as they will be counter-attacked; but, Sir Percy claims, there is a third side to the question—aircraft will destroy the battleships by torpedoes. “This is an arm that could have been, and ought to have been,

developed during the War, but the Admiralty had no appreciation of the value of it, and it was not perfected until the War was over. The introduction of dropping mobile torpedoes from aeroplanes has made the existence of the battleship still more precarious. If we or the Germans had at the battle of Jutland 40 aeroplanes, carrying torpedoes, one of the two fleets would never have reached home; the low visibility which obtained during that battle would have been all in favour of the aeroplanes; they could have come quite low down and made sure of their targets; they would, of course, have been accompanied by fast fighting machines to ward off counter-attacks.

“Mr. Walter Long only mentioned bombs. The use of mobile torpedoes introduces a question which will require very careful consideration before we even think of building another surface battleship.”

THESE discussions cannot help but do good to the cause. By spreading the light, in time the most moleish person cannot help but see where rigid adherence to red-tape tradition must ultimately land us.

It's Christmas now when d'Annunzio hopes to be getting away for his Rome-Tokio flight. And this time, by latest reports upon Fiume, it really looks as if he had prophesied correctly.

IN spite of all the egg-dropping on the Mahsuds, this pugnacious tribe has managed to carry on, after all, as the peace which they apparently sought for as a result of the first operations appears to have faded away somewhat. At the same time, it is early days yet to condemn bombing methods as useless, as the inner history of the effects has still to be written, and by latest news to hand, it would seem as if these warlike tribes are much inclined to call a halt, and it may well be that those bombs from the air have been a consideration in their minds. *Nous verrons.*

QUITE an amusing, if exciting, episode is reported from Berlin by Mr. George Renwick, the special correspondent of the *Daily Chronicle*, in connection with the first aeroplane to fly from London to Berlin. Mr. Renwick, writing under date December 13, says:—

“Two British ex-Army officers, Capt. Herne and Capt. Macnaught Davis, are probably the first two fliers who have had an encounter with German frontier officers in the air (always excepting the numerous encounters with German frontier guards which our fliers had, during the War, when they made a daily practice of invading the enemy's welkin).

“Messrs. Herne and Davis left London some little time ago on a Handley Page machine in order to take it to Warsaw, there to give exhibition flights.

“Five hours took them to Cologne, where they were held up for some time by bad weather.

“But the weather was not the only dilemma which faced them in the zone of Cologne.

“They applied to the German Pass Bureau in the Rhine zone for permits to travel over Germany, and in reply they were informed that:—

1. Passes would be given them; but
2. The Bureau had no authority to grant a permit for the entry of the aeroplane into the country.

Nevertheless, the two airmen decided to ‘chance it,’ and they left Cologne a few mornings ago for Berlin.

“They ran at once into more bad weather, and when not very far beyond the bridgehead (which extends about 20 miles east of Cologne) two single-seater German aeroplanes approached them.

“From the single-seater flew forth the signal to the Englishmen, ‘Alight!’ ‘Descend!’”

TAKING up the episode at this point, Captain Herne, who has been interviewed by a correspondent, said:—

“I suddenly saw two German machines in full war paint, Iron crosses and all, making for us. They flew close alongside, the airmen motioning to us with their hands to land. We did not want any explanations except with the proper authorities in Berlin, so we flew on, waving our hand in a friendly way.

“When the Germans saw that we were not coming down, they were furious, and flew round us for twenty minutes, crossing so close as almost to graze us with their wing tips and shaking their fists at us angrily.

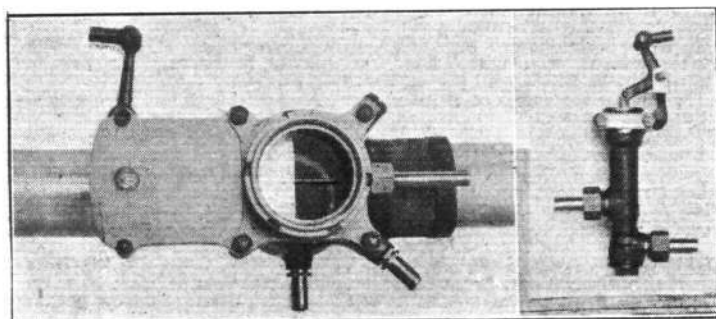
“At Spandau the Germans were simply amazed to find that we were a British civilian machine, and had never seen our international markings before, but they treated us very well, gave us hot drinks, and drove us to Berlin.”

ALL's well that ends well, and after a while, the necessary passes having been furnished to the voyagers, they were able to resume their journey, expecting to reach Warsaw in about five hours.



## THE BLOC-TUBE CARBURETTOR

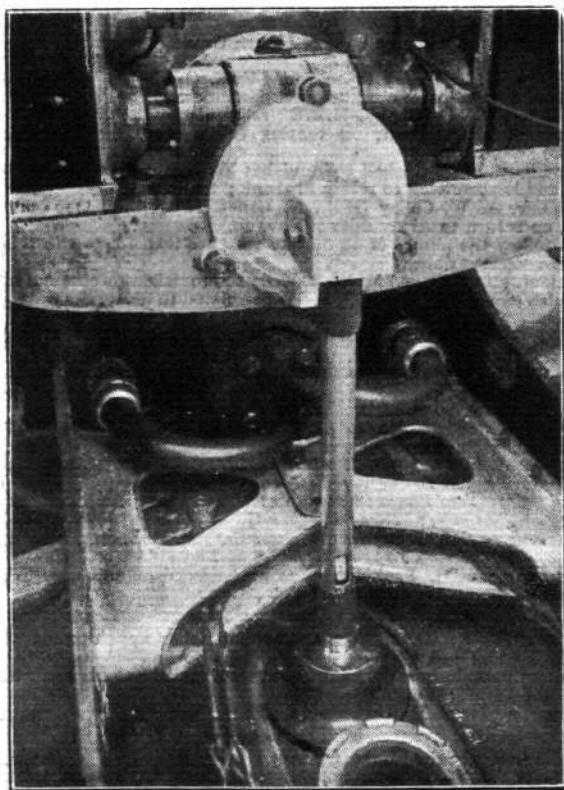
It would be difficult to secure a more expressive name for a carburettor than that selected by M. Rene Tampier, for it explains the principle upon which it has been designed. When he set to work on the problem of producing an aero-engine carburettor, M. Tampier set himself two guiding rules: 1, that the flow of the petrol from the tank to the engine should be free and not controlled by any automatically-operated device, and 2, that the final aperture through which petrol must pass should be capable of being cleaned when necessary and be free as far as possible from any possibility of being choked by any particles of dirt or foreign matter. He also realised that the conditions under which an aero-



**THE BLOC-TUBE CARBURETTOR:** Photograph showing the complete device. On the right the new Tampier Fine adjuster for controlling the amount of petrol fed to the carburettor

motor works are quite different from those which prevail for a motor-car engine. He noted that when the throttle of an aero-engine is being opened gradually the revolutions of the propeller increase in a definite ratio whether the machine be on the ground or in the air, or in other words the number of revolutions varies with the proportion of petrol supplied to the engine.

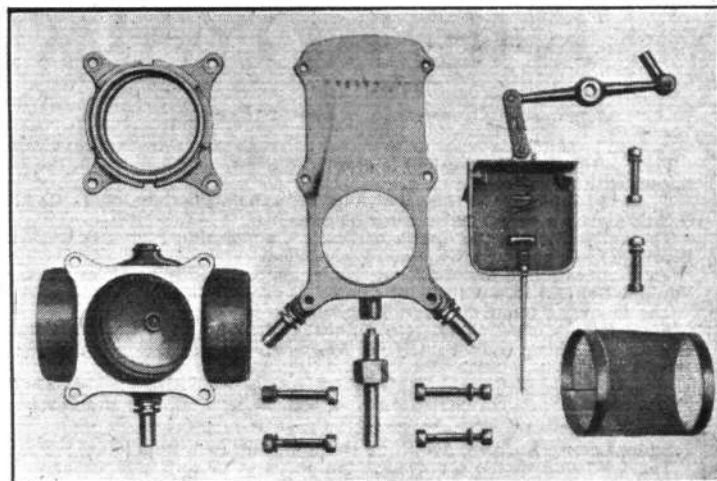
From the photographs showing the Bloc-tube carburettor



**Fitting of Bloc-tube petrol pump and drive on a Spad**

complete and in parts it will be realised that the device is a very simple one. The amount of petrol which passes to the engine is controlled by a tapered needle working in a nozzle at the end of the fuel supply pipe, while the air is regulated by the flat slide working across the circular inlet port. As a result, when the engine is running the petrol is

sprayed into the column of air, and so forms the explosive mixture; when the engine is stopped the needle cuts off the supply of petrol and is held down by a light spring, contained in the slide, pressing on its upper end. In order to obtain the correct proportions of petrol and air for various speeds of the engine, the needle is given a special shape,



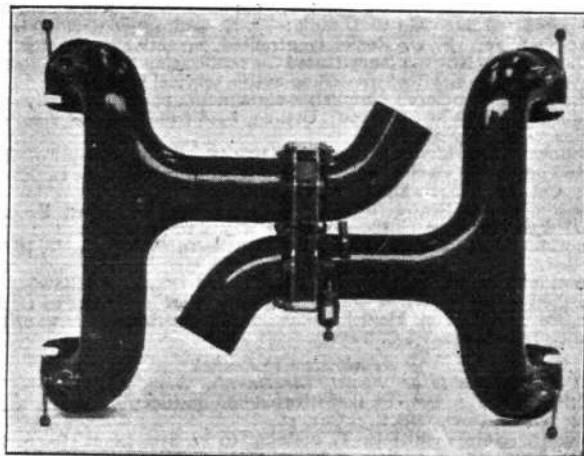
**The Bloc-tube carburettor dismantled, showing its various component parts**

this being determined, according to the type of engine, by experiments on the test bench and in the air.

Further, in order to obtain the weakest mixture under all conditions, M. Tampier thought out another device, which he calls a fine adjustment. It is in effect a cock, but designed on the same principle as the carburettor, inasmuch as it has a needle working in a jet, the position of the needle being controlled by a rod and lever. The fine adjustment also embodies a filter screen.

Having got thus far, M. Tampier set to work to produce a satisfactory control-lever, and eventually designed one which is held fast in any position by means of a friction-spring. This is connected up to the carburettor by rods and levers, and has proved so satisfactory in service that we understand it is a standard fitting on French machines, and has been used extensively on Allied machines.

Although the use of the Bloc-tube carburettor has been most extensive in connection with rotary motors, it has also given good results on fixed engines, and one of our photographs shows a twin carburettor fitted to a Hispano-Suiza engine. In this connection M. Tampier has devised a petrol pump worked positively, by means of a small bevel gear, from the engine. One of these pumps, working inside the petrol tank was tested for 500 hours at the French Govern-



**Twin Bloc-tube carburettor for Hispano-Suiza engine**

ment factory at Chalais Meudon, and when it was taken to pieces, every part was found to be in very good condition with no signs of undue wear and the inside of the pump was found to be quite clean.

These are but a few of the many ingenious devices which have been produced by M. Tampier, who, it is interesting

to note, worked for some time as a practical engineer at the Napier works at Acton. So great has been the demand for the Bloc-tube carburettor that the original works at Danemere Street, Putney, and Boulogne-sur-Seine proved insufficient and new factories were started at Lyons and

Turin. M. Tampier, however, keeps in touch personally with these branches and during the War he has been ably assisted by a British officer, Lieut. George Nicolet, to whom, we understand much of the credit for perfecting the Bloc-tube devices is due.

# THE ROYAL AIR FORCE

London Gazette, December 9

Flying Officer G. Archer (O.) is granted a permanent commn. in the rank stated, with effect from Aug. 1.

The notification in the *Gazette* of Aug. 22, appointing Capt. G. L. Godden, O.B.E. (T.) to a permanent commn. is cancelled.

The notification in the *Gazette* of Oct. 28, appointing Flying Officer C. T. Black (A.) to a permanent commn. is cancelled.

The notification in the *Gazette* of Dec. 2, appointing Flying Officer A. L. M. Van der Byl (A.) to a permanent commn. is cancelled.

The following temporary appointments are made:—

*Staff Officers, 2nd Class.*—(P.)—Sgdn. Ldr. R. J. F. Barton, O.B.E.; Dec. 4. (Q.) Sgdn. Ldr. F. A. J. B. Wiseman, O.B.E.; Oct. 18, from (S.O.), 1st Class.

*Staff Officers, 3rd Class.*—(P.) Flight-Lieut. L. A. K. Butt; Dec. 4. (T.) Flight-Lieut. W. J. B. Curtis, O.B.E.; Oct. 18, from (S.O.), 2nd Class.

## Flying Branch

Sgdn. Ldr. D. L. Allen, A.F.C., to be Sgdn. Ldr. (A.), from (S.O.); Oct. 18. The following Capt. are graded for purposes of pay and allowances as Maj. whilst employed as Maj. (A'ship), from May 1 to July 31:—R. A. Cochran, A.F.C., G. M. Thomas, D.F.C.

Flight-Lieut. D. G. Donald, A.F.C., to be actg. Sgdn. Ldr. whilst employed as Sgdn. Ldr. (A.), without the pay and allowances of that rank; Aug. 1.

Flight-Lieut. F. N. Halsted, D.S.C., D.F.C., to be Flight-Lieut. (A. and S.), from (S.O.); Nov. 24.

The following Lieuts. are graded for pay and allowances as Capt. whilst employed as Capt.:—R. B. Gibb (A'ship) to Sept. 8; L. W. Baker, D.F.C. (K.B.), to June 3; May 1. Lieut. S. G. Barlow to be Lieut. (O.), from (Ad.); July 22.

Flying Officer (actg. Flight-Lieut.) C. E. Maitland, D.F.C., relinquishes the actg. rank of Flight-Lieut. on ceasing to be employed as Flight-Lieut. (A.); Sept. 21.

*Second Lieutenants to be Lieutenants.*—(Hon. Lieut.) J. Duncanson; June 1, 1918 (since relinquished his commn.) (substituted for notification in the *Gazette* of Oct. 14. (Hon. Capt.) W. E. Dowling; Aug. 11, 1918. F. L. W. Dowling; May 16. K. S. Eagles; June 7. H. Natrass, I. C. Slater; June 20.

*Pilot Officers to be Flying Officers.*—J. E. Phelps; Aug. 7. J. F. Mehigan; Oct. 1.

P.F.O. H. W. Symmes (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A.); Aug. 1, 1918.

787002 Cdt. H. L. Edwards is granted a temp. commn. as Sec. Lieut. (O.); July 6, 1918 (substituted for the notification in the *Gazette* July 16, 1918, wherein this Cadet was described as "Harold Edwards").

Sgdn. Ldr. F. E. Sandford, A.F.C., is placed on the half-pay list; Dec. 10.

The following relinquish their temporary R.A.F. commns. on return to Army duty:—Lieut. G. F. Elliott (Lieut., Canadian A.S.C.); March 25. Lieut. C. A. Hore, M.C. (Lieut., N. Staffs. R.); June 26. Flight-Lieut. K. H. Riversdale-Elliott (Lieut., Scottish Rifs.); Nov. 9. Flying Officer R. J. E. P. Goode (Lieut., R. Dublin Fus.); Nov. 12. Flying Officer C. V. A. Bucknall (Lieut., Dragoons); Nov. 18. Flying Officer R. H. F. De V. S. Somerset, D.S.O. (Lieut., Coldstream Guards); Flying Officer (actg. Flight-Lieut.) A. D. K. Perkins (Lieut., R. Irish Fus.); Nov. 20. Pilot Officer (Hon. Flying Officer) C. B. Crawford (Lieut., Oxford and Bucks L.I.); Nov. 21. Flight-Lieut. S. P. Simpson (Lieut., Bedford and Hertford R.); Nov. 24. Pilot Officer (Hon. Flying Officer) H. J. Vickers (Lieut., Indian Army Res.); Dec. 3. Flight-Lieut. S. B. Horn, M.C. (Capt., Dragoon Gds.); Dec. 4.

(Then follow the names of 158 officers who are transfd. to the Unemployed List under various dates.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—J. N. Catling (contracted on active service); Oct. 20. F. O. Rooks (contracted on active service); Nov. 6. R. K. Mackenzie; Nov. 29 (substituted for notification in the *Gazette* Sept. 6, 1918. W. E. B. Oakley (contracted on active service); Dec. 2.

Sec. Lieut. H. C. Belore relinquishes his commn., being physically unsuited for the duties of Pilot or Observer; Oct. 23, 1918 (substituted for notification in the *Gazette* of July 26, 1918).

The following Sec. Lieuts. relinquish their commns. on account of ill-health contracted on active service, and are permitted to retain their rank:—W. C. Taylor; Oct. 17. H. B. Mills; Nov. 13.

The notification in the *Gazette* of Sept. 5 concerning Sec. Lieut. F. R. James is cancelled (notification in the *Gazette* of May 2 to stand).

The notification in the *Gazette* of Oct. 14 concerning Maj. A. K. Robertson is cancelled.

The notifications in the *Gazette* of Nov. 7 concerning the following officers are cancelled:—Lieut. W. S. Campbell (notification in *Gazette* of Oct. 24 to stand); Sec. Lieut. (Hon. Lieut.) E. Lawson (notification in *Gazette* of Nov. 25 to stand); Sec. Lieut. W. C. Taylor.

## Administrative Branch

*Flight Lieutenants to be Flight Lieutenants, from (S.O.).*—H. W. M. Paul, O.B.E., M.C.; Oct. 13 (substituted for notification in the *Gazette* of Nov. 18. G. C. Anne, O.B.E.; Oct. 18.

Sec. Lieut. (Hon. Lieut.) E. T. Fielding to be Sec. Lieut. (Hon. Lieut.), from (T.), from May 1 to Sept. 17, and is graded for purposes of pay and allowances as Capt. whilst employed as Capt. from May 1 to Sept. 17.

Lieut. C. M. McGorrey to be Lieut., from (O.); Dec. 18, 1918 (substituted for notification in the *Gazette* of March 4).

Flying Officers to be Flying Officers, from (S.O.) (Oct. 18):—C. S. Fulton, W. Myers, M.C., D.C.M. (Hon. Flight Lieut.) H. Pallett, and to be Hon. Flight-Lieut., A. G. Stradling, R. W. Ward, B. H. Godfrey; Nov. 12. Flying Officer E. G. Williams to be Flying Officer, from (A.); Oct. 27.

*Second Lieutenants to be Lieutenants.*—T. Gill; Oct. 22, 1918 (substituted for notification in *Gazette* of July 29). A. L. Kidd; May 4. W. E. G. Heanley, M.B.E.; July 10.

Sec. Lieut. (Hon. Lieut.) T. Mumford to be actg. Lieut. whilst employed as Lieut.; Aug. 8, 1918 (substituted for notification in *Gazette* of Oct. 29).

Sec. Lieut. S. A. Hipple (late Gen. List, R.F.C., on prob.) is confirmed in rank as Sec. Lieut.; March 1.

Capt. (Hon. Maj.) T. M. Ross (Qmr. and Maj., Dragoons) relinquishes his commn. on ceasing to be employed; Nov. 19.

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Lieut. C. E. Bright (Lieut. (actg. Capt.) E. Lancs. R.); Feb. 8. Flight-Lieut. K. B. Harbord (Capt., R.F.A.); Nov. 23.

(Then follow the names of 27 officers who are transfd. to the Unemployed List at various dates.)

Lieut. C. S. Bignell relinquishes his commn. on account of ill-health caused by wounds, and is granted the rank of Capt.; Dec. 2.

Sec. Lieut. A. F. P. James relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Dec. 1.

The notification in *Gazette* of Nov. 7 concerning Capt. E. P. L. Baker is cancelled.

## Technical Branch

Wing Comdr. (actg. Group Capt.) A. V. Bettington, C.M.G., relinquishes actg. rank of Group Capt. on ceasing to be employed as Group Capt.; Nov. 17.

Sgdn. Ldr. F. H. Unwin, O.B.E., to be Sgdn. Ldr., Grade (B), from (S.O.); Oct. 18.

The following Capt. are graded for purposes of pay and allowances as Maj. whilst employed as Maj., Grade (A.):—A. M. Low; May 1. H. L. Ratty (from May 1 to July 31).

Sec. Lieut. R. G. Meech is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade (A) (from May 1 to Aug. 28).

Sec. Lieut. C. W. Bentley to be Lieut., Grade (A.); May 16 (substituted for notification in *Gazette* of July 29).

*Second Lieutenants to be Lieutenants.*—P. A. Edmonds, R. H. B. Tomlinson; May 16.

Sec. Lieuts. to be actg. Lieuts. whilst employed as Lieuts., Grade (A):—R. J. Shanks (from April 1, 1918, to Aug. 31, 1918); (Hon. Lieut.) P. A. Albrecht; June 22, 1918, to Feb. 27.

Sec. Lieut. J. Parsons is graded for purposes of pay and allowances as Lieut. whilst employed as Lieut., Grade (A) (from Feb. 15 to July 21).

Lieut. (Hon. Capt.) W. C. Green, M.C., to be Lieut., Grade (B), from (Ad.); July 1 (substituted for notifications in *Gazettes* of July 29 and Sept. 12).

Sec. Lieut. F. Denham to be actg. Lieut. whilst employed as Lieut., Grade (B) (from Sept. 30, 1918, to April 30) (since demobilised).

Pilot Officer (actg. Flying Officer) L. Freeborn, M.B.E., relinquishes actg. rank of Flying Officer on ceasing to be employed as Flying Officer, Grade (A); Nov. 22.

Sec. Lieut. A. G. Allan to be Sec. Lieut., Grade (A) from (Ad.); Aug. 10, 1918.

Sec. Lieut. H. L. Vahey to be Sec. Lieut., Grade (A) from Unemployed List; Nov. 6, with prec. next below S. Maunier.

Pilot Officer J. H. Furness, M.B.E., relinquishes the grading for pay and allowances of Flight-Lieut. on ceasing to be employed as Flight-Lieut., Grade (B); Nov. 30.

Flight-Lieut. P. P. Gaskell relinquishes his commn. on ceasing to be employed, and is permitted to retain his rank; Sept. 22.

Sgdn. Ldr. A. W. Colley (Maj., N. Lancs. R.) relinquishes temp. R.A.F. commn. on return to Army duty; Nov. 20.

(Then follow the names of 28 officers who are transfd. to the Unemployed List under various dates.)

Sec. Lieut. (Hon. Lieut.) M. W. J. Kelly relinquishes his commn. on account of ill-health (caused by wounds), and is permitted to retain the rank of Lieut.; Dec. 2.

Lieut. J. G. Proger is dismissed the Service by sentence of a General Court-Martial; Oct. 23.

The notification in the *Gazette* of Nov. 7 concerning Sec. Lieut. E. W. Barton is cancelled.

## Medical Branch

Flight-Lieut. (actg. Sgdn. Ldr.) W. Darling, M.C., to be actg. Wing Com. whilst specially employed; Nov. 1.

Flight-Lieut. (actg. Sgdn. Leader) H. M. S. Turner, M.B.E., to be actg. Wing Comdr. whilst so employed; Dec. 1.

*Flying Officers to be Flight Lieutenants.*—P. C. Parr; Aug. 14. M. Hyman; Oct. 31. A. Briscoe; Nov. 19. E. G. O'Gorman; Nov. 21. C. McC. Jones; Nov. 25. S. G. Seymour; Nov. 26. W. E. Sheil; Nov. 27.

(Two officers transfd. to the Unemployed List.)

The surname of G. Packham is as now described and not "Packman," as stated in *Gazette* Aug. 8, 1918.

## Chaplains' Branch

The Rev. B. W. Keymer, O.B.E., relinquishes appointment of Deputy-Chaplain-in-Chief and relative rank of Sgdn. Ldr. on ceasing to be employed as Deputy Chaplain-in-Chief, and reverts to rank of Chaplain, with relative rank Flight-Lieut.; Oct. 20.

(One officer is transfd. to Unemployed List.)

## Memoranda

The following Prob. Flight Officers are granted hon. commns. as Sec. Lieuts.:—H. J. Drew; Feb. 23. N. J. C. Clark, H. Knight; March 7. E. W. Alston-Smith; April 11. N. G. Durham; May 19.

(Then follow the names of seven Cadets granted hon. Commns. as Sec. Lieuts.)

Wing-Comdr. J. W. O. Dalglish, O.B.E., is placed on h.p. list; Dec. 10.

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Flight-Lieut. A. P. Davidson (Lieut., H.L.I.); Nov. 27. Sgdn. Ldr. H. E. Rudkin, O.B.E. (Maj., R. Irish Regt.); Dec. 1.

Capt. (actg. Maj.) H. F. Atkinson-Clark, M.V.O., O.B.E. (Capt., Scots Gds.), relinquishes his commn. on ceasing to be employed, and is permitted to retain rank of Maj.; Aug. 1.

Maj. H. F. Towler (actg. Lieut., R.N.R.) relinquishes his commn. on ceasing to be employed, and is granted rank of Lieut.-Col.; Oct. 25 (substituted for notification in *Gazette* Nov. 11).

(Two officers transfd. to Unemployed List.)



# AVIATION IN PARLIAMENT

## Compensation for Air Raid Damage

CAPT. MARTIN, in the House of Commons on November 8, asked the Prime Minister whether he can offer any hope of compensation for injuries to person or property of civilians caused by air raids?

Mr. Chamberlain: The Treaty with Germany provides that compensation may be claimed from Germany in respect of damage to injured persons and to surviving dependants by personal injury to or death of civilians caused by attacks from the air, and in respect of damage to property of civilians injured or destroyed by the acts of Germany or her Allies from the air. Claims, if not already furnished to the Foreign Claims Office, should be sent to the Board of Trade. I am not, of course, in a position to say how much will be recovered from Germany in respect of them.

Sir J. Butcher: Will the person who makes the claim get paid anything if Germany does not carry out her obligations to pay?

Mr. Chamberlain: No.

Mr. Rawlinson: When is it expected Germany will make the first payment on account?

Mr. Chamberlain: I have answered practically the same question two or three times. Payment by Germany cannot be received until after the Reparation Commission has got effectively to work, and the Reparation Commission cannot get to work until after the Treaty has been ratified.

## Air-Mail Service Fees

LIEUT.-COM. KENWORTHY asked the Postmaster-General whether he is aware that the Assistant Postmaster-General in the Government of the United States of North America has stated that by use of aeroplanes to carry mails between New York, Chicago, and Washington at 2 cents a letter, a saving will be effected of over \$1,500,000 in 1920 over all other methods of transit; and, in view of this statement, will he reconsider the air-mail fee of 2s. 8½d. between England and France with a view to popularising this service and placing it on a commercial footing?

Mr. Pease: The sum of \$1,500,000 referred to by the hon. member is the estimated value of the travelling post offices and other railway rolling stock and the time of post office sorters which will be rendered unnecessary by the provision of the additional aeroplanes recently ordered by the United States Post Office for its air mail services. Payment for the conveyance of mails by rail in the United States is made on a basis different from that in force in this country; but I do not gather that the sum indicated is a net saving consequent on the use of aeroplanes for the conveyance of mails. The air mail service between London and Paris is experimental, and the arrangements are of a temporary character and will be reviewed after six months' working. I hope that when permanent arrangements for the service are made it will be possible to reduce the amount of the special fee.

## Anti-Aircraft Gun, Hyde Park

SIR O. PHILLIPS asked the First Commissioner of Works whether, in view of the historic interest attaching to the anti-aircraft gun which stood in Hyde Park and assisted to protect London from the attacks of German aircraft, arrangements can be made for this gun to be re-erected in Hyde Park on the same site with a suitable inscription?

Mr. Churchill: My right hon. friend has asked me to answer this question. It is proposed to place in the War gallery of the London Museum, Lancaster House, an anti-aircraft gun which formed part of the London Anti-Aircraft Defences.

## Anti-Aircraft Station, Putney Heath

MR. LORDEEN, on December 9, asked the Secretary of State for War whether, seeing that it was proposed to continue the anti-aircraft station at Putney Heath until a permanent site was found, he would give instructions for the station to be put in a cleanly and satisfactory state at once and some provision made for washing motors and lorries other than the roadway; and would he state what steps, if any, had been taken to prevent contamination of the filtered water in the reservoir?

Mr. Churchill: I am informed that there is no other space for washing motors and lorries other than at the side of the road, where a special place was made for that purpose. Special precautions have been taken in order that the filtered water in the reservoir should not be contaminated, and the wash-houses and latrines have been constructed well away from the reservoir. A sanitary inspector recently inspected this station and expressed his satisfaction. The Water Board were also satisfied with the arrangements made. Instructions have been issued for the station to be kept in a cleanly and satisfactory state.

## British Aeroplanes at the Paris Exhibition

LIEUT.-COM. KENWORTHY asked how many British aeroplane firms are showing at the Paris Exhibition; whether the number is satisfactory; and what steps are being taken to encourage and assist British firms to attend foreign exhibitions of aircraft?

Capt. Guest (Joint Parliamentary Secretary to the Treasury): I have been asked to reply to this question. The answer to the first and second parts is that six British aeroplane firms are showing at the Paris Exhibition, and that on the whole this number of exhibitors may be taken to be satisfactory. The Society of British Aircraft Constructors was unable to obtain sufficient space on the ground floor for a corporate exhibit, and, therefore, are not exhibiting. In regard to the last part of the question, offers of assistance were made to the Society of British Aircraft Constructors at a meeting held early in October.

## Air Ministry Stores Deficiencies

MR. RAPER asked the Secretary of State for War how much has been written off since the Armistice as a charge against the public for stores deficiencies of air squadrons stationed in Great Britain and of the various air store depôts and parks which were at that time in existence?

Capt. Guest: This information would take some time to collect, and I am unwilling at present to throw additional work on the Air Ministry and local Air Force staffs; but if my hon. friend presses for it, I will obtain the information and send it to him.

Mr. Raper: Can the hon. and gallant gentleman give us some rough idea of the amount?

Capt. Guest: No, I cannot, and I do not think a rough idea is what the hon. member requires.

Mr. Raper: When can we have these particulars?

Capt. Guest: When the pressure on the Ministry is a little less than it is now.

## Australia by Air

SIR N. MOORE: Has the Secretary for War received any official information as to the arrival of Capt. Smith Ross in Australia?

Mr. Churchill: I understand he has successfully arrived, and I think I shall be doing right in sending official congratulations on this very remarkable exploit.

## Navy Estimates and Aviation

In introducing the Navy Estimates in the House of Commons on December 10, Mr. Walter Long, in the course of his speech, said: "Who can say what is going to be the development of the Air Service in the future, and what is to be the effect of the Air Service? I was told today that the Royal Air Service is going to be so effective that it will destroy the battleship, which is such a big target. That is the view of one side. I go to a great airman and I say, 'I am told that our big battleships are no longer going to be of any use because they offer such big targets for bombs, which are heaven knows

how many tons in weight and which are to be dropped from the clouds on to the battleships.' He said: 'Some people will tell you that, but, speaking for the air people, I can say that as fast as they are developing these attacks we are developing the counter-attack and the defence, and we shall have something to say before you abandon your big ship simply because an airship has been devised that is going to threaten you with bombs.' There are two sides to the question. I am taking neither side. We have today in His Majesty's Navy some of the most magnificent ships the world has ever seen, and to destroy these vessels because we are told that the air is going to replace the Navy would be a criminal thing for any Board of Admiralty to do.

"The suggestion has been made more than once that there ought to be a staff composed of representatives of the Admiralty, the War Office and the Air Ministry, and that they should meet in order to discuss and consider the greater problems, the world problems, which we shall have to solve in the near future. I say for the Board of Admiralty, both naval and civilian members welcome the joint arrangement by which the chiefs of the staff of each Department may meet periodically in order that our plans may be concerted. Whatever the predictions of those who believe we can do without a Navy, I believe the people of the country will continue to demand that there shall be a Navy sufficient to give us reasonable security."

Mr. George Lambert said he did not consider that the Secretary of War should be at the same time Secretary for Air. The naval services of the country could not be carried on without the Air Service, and he would put the Air Ministry under the Admiralty.

Rear-Admiral Adair charged the Admiralty with being negligent as regards the Air Service. Aviation was only a means to an end, and that end in the case of the Air Service attached to the Navy was maritime warfare. The Naval Air Service must be formed of men who were part and parcel of the Navy—naval officers; no amateurs could effectively do the work. When the Admiralty allowed the whole of this Service to be turned over to the Air Ministry they made a still greater blunder than when they started it as a separate service, though administered by the Admiralty.

Maj.-Genl. Seely said it was impossible to exaggerate the effect that developments in the air might have on the Navy. He pointed out the difficulty which would arise when the First Lord of the Admiralty went for aircraft to the Secretary of State for Air (who was also Secretary of State for War) and was told he could not have the aircraft he wanted because they were wanted for the Army. It was gambling with the safety of the State, when they had a service depending to an ever greater degree on development in the air that that air development should be subject to the probability of being thwarted by the chief competitor masquerading as the Secretary of State.

Mr. Long, replying to Col. Seely, said the First Sea Lord and the Chief of the Air Board had been in constant communication. He did not say for the moment he was satisfied with what the Air Board had done, but he had no reason to believe they had surrendered themselves to the War Office. All he could say was that if, or when, the moment arrived when he found the Navy suffered he should have to consider his position, and that he should not hold his office a moment longer than was consistent with his duties as First Lord.

## The Resignation of General Seely

IN the House of Lords, on December 10, Lord Montagu called attention to the resignation of Genl. Seely and called for papers. He said his first object was to inquire what were the reasons which led to the resignation of Genl. Seely; secondly, whether there should be an independent Air Force and Air Ministry, or whether there was an intention on the part of the Government to revert to the former bad system under which the Air Force was separately under the Admiralty and the War Office. While giving credit to Mr. Churchill for great energy and ability, it seemed to him to be quite impossible for any Minister to give adequate consideration to the problems of the Army and those of the Air Force at the same time. Unless the Air Force were kept entirely independent it would be neglected and other Great Powers would come abreast of us.

Lord Trevelyan appealed to the Government to state their policy in regard to aviation generally. Could not the elements of offence and defence in this country be represented by one great Department or something of that sort?

Lord Vernon expressed the opinion that the Navy should be allowed to have their own air force, as airships were as much a weapon of the warship as the gun. Civil flying should not be mixed up with the flying services. It should be somewhat similar to the mercantile marine and not definitely under the orders of the Admiralty.

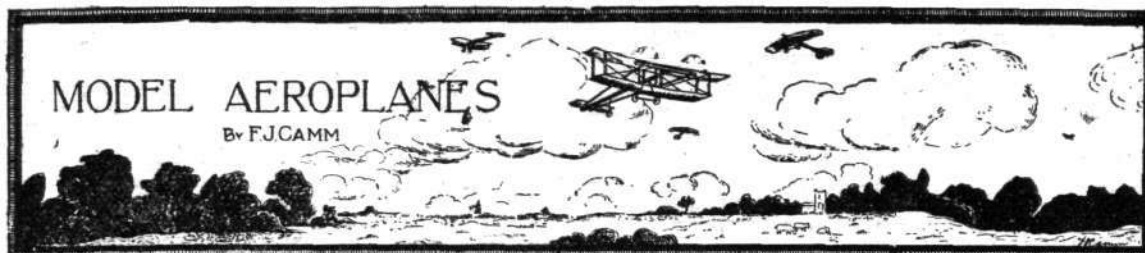
THE LORD CHANCELLOR said that for the reasons which induced General Seely to resign they must look at the explanation which he himself made in the House of Commons. The Government took the view some two years ago, after long war experience, that it was desirable that there should be a single and independent Air Service. The arguments on one side and the other were weighed in the balance and as a result the policy of the Government was to maintain the separate and independent character of the Royal Air Force in peace and in war. The Ministry had aimed at creating a separate permanent Air Service which would afford as good opportunities of advancement to officers and men as were afforded in the Army and Navy. The Prime Minister had to decide whether the two offices should be held by one Minister, and took the view that the scale, size and cost of the Air Force in the years immediately following the war would not be sufficiently large to justify the appointment of a separate Minister of State. It might well be that in years to come the importance of the subject would grow and if circumstances altered and the necessity arose the present arrangement would lapse. Dealing with civil aviation, he said the day might come when the Board of Trade would assume control of and responsibility for civil aviation in much the same way as it had assumed control over the mercantile marine. Whether the suggestion of a kind of amalgamation of the Army, Navy and Air Force would ever be realisable he did not know; but by the present arrangement they had at least produced a system by which the best brains of the Air and the best brains of the Army could be brought to bear upon the problem in order to try all the resources both of the Air and of the Army.

## The W.R.A.F. Inquiry

IN the House of Lords, on December 15, the report of the W.R.A.F. Inquiry came up for consideration and Lord Stanhope made a personal statement. He desired to withdraw unreservedly his specific statement of immorality against certain people, made in the House on July 30, and to apologise to their Lordships for having made it. He desired to apologise to Col. Janson and Miss Glubb for having made any allegation against them. He had already communicated with their respective solicitors apologising for his statements, and had paid the whole of Miss Glubb's costs in connection with the inquiry.

Earl Curzon, in the course of a speech, said the result of the inquiry was that a large sum of public money had been expended, an immense amount of personal suffering had been caused and most inadequately compensated by the vindication that had been received, and a precedent had been set up which he agreed with the Committee in saying that they earnestly trusted would not form a precedent ever to be followed again.

Lord Salisbury hoped that the history of this case would not restrain their lordships from applying the remedy to abuses where they considered such abuses existed.



NOTE.—All communications should be addressed to the Model Editor.

### Further Notes on Airscrews

THE principles of airscrews working in air is precisely the same as that of screws working in water, the only difference being in the density of the media, air being only  $\frac{1}{800}$  the density of water. From the reaction of the blades on both fluids, we derive thrust, and what is known as slip is also existent in both fluids. If air were a solid the screw would advance in it a distance equal to its pitch, but its extreme elasticity, the inertia of the blades, the skin friction and drift of the latter results partly in forward movement of the screw and partly in backward movement of the air.

This amount of retrograde action or loss of forward movement is known as slip and is expressed as a percentage of the theoretical pitch. The loss due to slip with airscrews fitted to flying models depends upon the design and workmanship of the machine and the extent to which drag has been eliminated by streamlining the exposed portions, and it, therefore, by no means follows that a screw showing a low slip percentage on one model will show the same on another, and ingenuity should be exercised to do away with parts which at first seem necessary and unavoidable.

The thrust is a matter upon which model makers do not generally seem to trouble themselves; it is a measure of the mass of air moved. The mass equals the density of the air multiplied by the velocity in feet per minute, and multiplied lastly by the area of the propeller disc which is calculated from the formula  $3\frac{1}{2} \times \text{radius}^2$ . In model

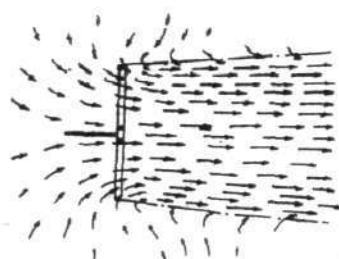
the model varies with different machines; it can generally be accepted that a machine flying with a low thrust has the best lift-drag ratio, and is the most efficient machine—I refer, of course, to comparative results with machines of the same class, the tractor type requiring a higher thrust than a "pusher" or canard of similar weight.

In some interesting experiments with screws, wherein candle smoke was used to show the direction of the air currents, (an experiment originally, I believe, introduced by Mr. E. W. Twining) it was found that when an airscrew is revolving it draws in air from all round the periphery of the circle of rotation, as well as immediately in front of it, and to a lesser extent from the rear. The air is deflected or driven back in a column which, with ordinary model airscrews, takes the form of a truncated cone (Fig. 1). The candles were arranged some distance in front of the revolving airscrews and then suddenly—and simultaneously—extinguished, the result being columns of smoke which indicated quite clearly the form of the deflected column of air.

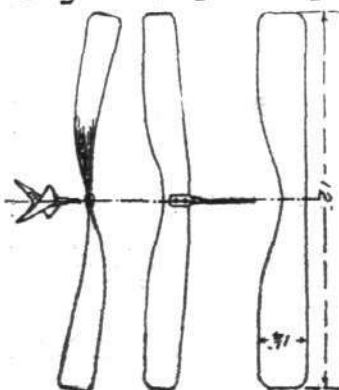
One of a pair of screws which proved to be most efficient is shown by Fig. 2.

### A Compressed Air-Driven Monoplane

The side elevation, Fig. 3, shows the monoplane driven by the compressed-air plant evolved by the writer. Its



Efficient Bentwood Fig. 2



Direction of Airflow  
Truncated Cone  
Fig. 1

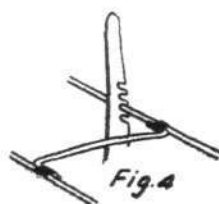
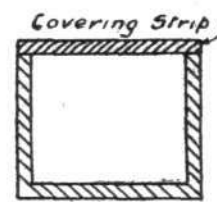


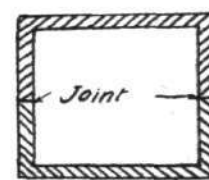
Fig. 4



Central Skid  
Fig. 5

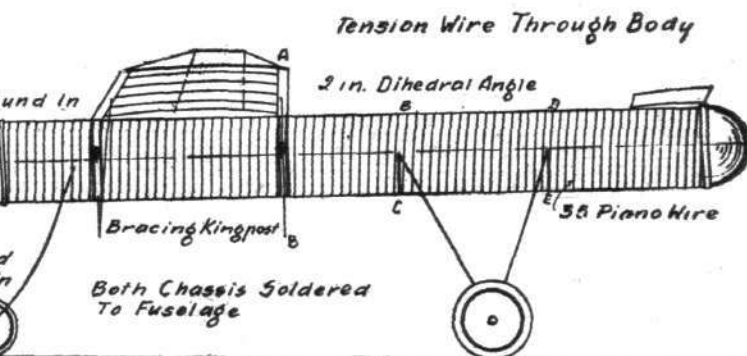


Hollow Spar Sections  
Fig. 6



Side Elevation of Veneered Spar  
Fig. 7

flying I have found that it is better to employ slow-running screws of large diameter, narrow blades and moderate pitch (from  $1\frac{1}{2}$  to  $1\frac{3}{4}$  times the diameter) in preference to small screws of large blade area, high speed and long pitch. This holds true for both carved and bentwood screws, and is a generally accepted rule. Up to about 15 ins. diameter the thrust bears a direct relation to the torque at the shaft, the means of determining which were explained last week. The blades of the screws may be considered aerofoils, the pitch angles corresponding to the angle of incidence, thrust being compared with the lift and the torque at the shaft being tantamount to the force driving the foil through the air. Others prefer to consider the airscrew a portion of a double helix or screw, using the air as a nut through which it screws itself, but I consider the aerofoil theory the better of the two. The relation between the thrust and the actual weight of



Side Elevation  
Fig. 3

weight complete was 18 ozs., best performance 37 secs. The following particulars will doubtless be of interest. The monoplane (built up of birch) is of tapering wing-plan, the leading edge being straight and 42 ins. span, whilst the trailing edge sweeps forward and is 48 ins. span. The chord is 8 ins. at the centre and  $6\frac{1}{2}$  ins. at the tip. The elevator is of piano wire with rack adjustment as in Fig. 4, whilst the chassis is sprung as in Fig. 5 with a central skid which was afterwards found to be necessary. The container is  $2\frac{3}{4}$  ins. diameter, it taking approximately 120 lbs. pressure, and 120 strokes with a foot pump  $1\frac{1}{2}$  in. bore—1 lb. pressure to a pump-stroke. It was found that the model would just fly with 60 lbs. pressure; the gauge was attached to the



foot pump. My conclusions drawn from experiments with compressed air are: (1) that it gives much trouble owing to the high initial thrust, tending to make the machine helicopter at first and then when thrust has dropped to appear to be under elevated, and (2) a reducing valve must be used, for preference of the plunger or piston type. I see no reason why flights equally as good as those obtainable with rubber should not be obtained with compressed air. My engine had pistons very free within their cylinders, yet this did not interfere with the efficiency, probably owing to the high speed of the engine. In any case pistons should not be a *ground-in* fit. The oscillating type of engine is quite useless.

I find that results almost as good can be obtained from a three-cylindere engine as a five-cylindere; the latter, apparently, requiring a container two-thirds larger than the former. The loading should be somewhere near 6 ozs. per sq. ft., and the ratio of length to span in the neighbourhood of 3:2.

#### Hollow Spars for Models

In all the flying models constructed by the writer, hollow spars are used as the mainspar or motor rod. They possess the combined advantages of great strength and lightness, and by their use bracing can be entirely eliminated, although it is advisable to use a twin-winding arrangement (to be described next week) to balance stress on the motor rod. It is usual for a spar to break, as the result of a head-on collision, at a point about one-third the length of the machine from the front, hence the spar should be of greatest cross-section at this point to reduce the possibilities of a smash. I do not consider that fancy sections or contours need be given to the spar, the plain rectangular section being the best to employ. In making them, a single U should be employed, with a covering strip glued over the open end. When the glue has thoroughly set, the spar can be trimmed up and tapered off. When two U section spars are used (Fig. 6) there always seems to be a tendency for them to twist apart. Another method of making these light tubes for mainspars is to use a wooden former of circular cross-section, wrapping cartridge paper round and gluing each convolution, withdrawing the former when a tube of required

thickness is obtained. Such tubes may be employed to totally enclose the skeins, thus obviating the resistance of the vibrating skein, with a resultant improvement in stability and a reduction in the power required; but enclosed skeins, whilst possessing many advantages, are troublesome, in so far that it is impossible to see what is happening inside; a strand may have broken or slipped its anchorage, and the tube has to be partially dissected to find the cause of the trouble. My own hollow spars have usually weighed  $\frac{1}{4}$  oz. per foot run—slightly under this, a spar 4 ft.  $\frac{3}{4}$  in. long weighing 1 oz.; no advantage accrues by further reducing weight. I usually make the cross-section  $\frac{1}{4}$  in. by  $\frac{3}{8}$  in. with the greatest measurement placed vertically for strength and the covering strip on top. The width of the groove is  $\frac{5}{16}$  in. and the depth  $\frac{3}{8}$  in. for a 4-ft. spar.

In my later articles, wherein I shall go fully into the methods of construction, the construction of hollow spars will be dealt with. The latest form of hollow spar has a fretted-out web with a covering strip of veneer on each side. These spars are immensely strong and can be made of pleasing proportions.

#### Single or Double Surfacing?

Double surfacing does not appear to be essential with model aeroplanes, but it would be interesting to hear the results of any who may have resorted to this form of covering. Theoretically, of course, the curve of the bottom section should be less than that of the top, and, as single surfacing seems to be the general rule, there would appear to be room for improvement in this direction. With small models the weight of the extra silk would more than counterbalance the advantages accruing, but with machines weighing a pound or more, this should not hold true. There is an erroneous tendency to employ cambers entirely disproportionate to the size of the plane; the maximum camber should never exceed one-twentieth of the chord, and should be situated at a point two-fifths of the chord from the leading edge. It is best to bend the ribs *after* the plane has been made, as perfect alignment of the camber of each rib is thus made possible.

(To be continued.)

#### "Aeroplane Undercarriages"

OWING to the very great pressure upon our space this week, we regret that it has been necessary to hold over the second instalment of Mr. J. D. North's paper on aeroplane undercarriages.

#### No. 6 Wing R.N.A.S. Dinner

MEMBERS of No. 6 Wing R.N.A.S., Otranto, Italy, held their first re-union dinner on Saturday, December 13, at the Trocadero. Col. G. H. K. Edmonds, D.S.O., the first C.O. of the Wing, presided, and the visitors included Comdr. Murray Sueter, R.N., Col. A. Longmore, D.S.O., Comdr. Beuttler, R.N.R., Maj. Pulford, Maj. Mackenzie, and Maj. Leslie. Comdr. Seuter, in briefly reviewing some of the work that had been carried out by the Wing, dealt with the possibilities of torpedo-carrying machines, and their effect on future wars. It is hoped that the dinner will become an annual affair.

#### The Wakefield Boxing Trophy

THE offer of Sir Charles C. Wakefield, Bart., to present a handsome set of trophies, cups and medals for boxing to the officers and men of the Royal Air Force has now been gratefully accepted by the Air Council, and the trials will shortly commence. It may be recalled that the design of the trophies was selected by competition, and the actual trophies are now on public view at Messrs. Skinner and Co., Ltd., 34, Bond Street, W.

#### Temporary Suspension of Avro Pleasure Flying

It has been decided by the directors of Messrs. A. V. Roe and Co., Ltd., that their programme of pleasure flying is to cease for the winter months. Though there are many days during the winter on which flying is very enjoyable, such days are a minority in a British winter; and it is very doubtful whether the public is yet sufficiently educated in air matters to grasp the fact that a flight on a clear frosty day, especially if a light fall of snow has taken place, is one of the most exhilarating of winter sports. This decision, however, does not mean that all Avros will be sent away from Hounslow. Arrangements will be made for flying pupils to continue their courses of instruction, and demands for special services can be met. It is only the short pleasure flights which are being discontinued.

#### The Double Fatality at Caterham

THE first fatal accident in connection with the London-Paris service occurred on the afternoon of December 11,

when an Airco machine piloted by Lieut. S. Bradley crashed at Caterham. Apparently the pilot, having run into a mist, tried to land at the Kenley aerodrome, but the machine crashed through a tree and came down near the Guards' Depot. The passenger, Mr. George F. Rand, a banker of Buffalo, N.Y., was instantly killed, and the pilot was so seriously injured that he died on Saturday. At the inquest on Mr. Rand the Coroner certified that his death was due to an accident, brought about by the misty weather.

#### Madrid to London Flight

CAPT. COCKERILL and CAPT. BROWNE, who arrived in London on the 9th inst. on a Vickers-Vimy-Rolls Bombing Machine, having flown from Madrid, had an exciting voyage. They left the Spanish capital on the morning of the 4th in thick mist, but flying above this and clouds, crossed the Guadarama Mountains at a height of 7,000 ft. They kept a compass course above clouds for  $1\frac{1}{2}$  hours, then came through and found Aranoa, while Vittoria was reached in 2 hours 40 minutes. There the aerodrome was very wet; the machine was bogged, and it took one day to get out of it. On leaving they crossed the Pyrenees above the clouds on a compass course, and came through clouds about 6 miles out to sea off Orizaba. On arrival at Bordeaux they found the aerodrome under water, so decided to make for Paris, but the light failing, they landed at Tours, 4 hours 60 minutes after leaving Vittoria. Next day they reached Paris, the weather still being very bad, clouds 500 ft., rain and snow the whole way, taking 2 hours.

Leaving Paris on the 8th inst. in 40 mile an hour gale, they ran into several bad storms, and were forced to land at Marquise after 3 hours 50 minutes fighting against a gale. They left for London Tuesday morning, 9th inst., in a thick mist and head wind. On reaching Chatham the mist was so bad that they could not see the ground from 300 ft., but they flew by compass and found Hendon  $1\frac{1}{2}$  hours from Marquise.

#### A Handley Page in Peking

THE assembling of the first Handley Page aeroplane in Peking was completed on December 6, and during the same afternoon the machine made its preliminary flight with complete success, reports *The Times*. "As the Handley Page machine was put together by Chinese workmen unable to converse with the foreign mechanics in charge, there was some anxiety about the trial, which was speedily dispelled by the splendid style the machine took the air."

## SIDE-WINDS

DURING the week ending December 10, there were 34 passengers and 1,245 lbs. of freight carried on the H.P. London-Paris service, and on nearly every day inclement weather had to be contended with. In order to protect the pilots of the Handley Page commercial aeroplanes, cowlings, containing Triplex safety glass, are being built over the cockpit to afford protection from the rain and wind-storms constantly encountered on the Continental air-ways during the winter months. On the London-Paris air service between September 2 and December 10, 1919, 613 passengers and 13,601 lbs. of goods have been carried, the total distance covered being 33,350 miles. On December 9 Sir George Noble flew to Paris (for the third time) in a Handley Page commercial aeroplane.

ON the London-Brussels service nine passengers and 434 lbs. of freight were carried. On December 4, Capt. W. L. Hope and Lieut. McIntosh, flying two Handley Page commercial aeroplanes carrying passengers from Brussels, encountered a severe thunderstorm soon after reaching the English coast. The machine passed through the storm and landed safely. 244 passengers and 25,249 lbs. of freight have been carried on the London-Brussels air service during the period extending between September 26 and December 10, 1919; a distance of 18,380 miles having been covered.

FROM Messrs. North and Sons, whose name is a household word in connection with the Watford speedometer, we learn that the Rolls-Royce engines fitted to the Vickers-Vimy machine which has just accomplished the first flight to Australia, were fitted with their "Watford" magneto. It may be recalled that Sir John Alcock's machine, which crossed the Atlantic, was also fitted with Watford magnetos.

AFTER giving all due praise to the magnificent performance of pilots and mechanics in the epoch-making flight from London to Australia, a word or two should be said for the landing gear that made this performance possible, necessitating as it did halts at improvised aerodromes and landing grounds between London and Australia. "The Vickers-Vimy" was fitted with four 900 mm. by 200 mm. Palmer landing wheels, or, to put it in language better understood by the man-in-the-street, four wheels shod with Palmer cord tyres 3 ft. high, and 8 ins. cross section. All landings on this long flight were made without a single hitch, the various stages being reeled off with clock-like precision.

Hounslow to Melbourne makes a very big line on the map, and we look forward to the circumnavigation of the globe at not a very distant date by a British machine. The Palmer Tyre, Ltd., have every confidence that Palmer landing wheels and tyres will play an equally successful part.

MESSRS. C. C. WAKEFIELD AND Co.'s organisation in connection with the England-Australia flight was completeness itself. They had supplies of Castrol "R" at every stopping place, and Capt. Ross Smith was thus enabled to replenish his tanks without delay—a very important detail. Wakefield's have every reason to feel proud of their association with the latest and greatest feat in aviation.

It is noteworthy that the Rolls-Royce engines on the Vickers-Vimy piloted by Capt. Ross Smith, M.C., D.F.C., A.F.C., from London to Australia, were fitted with the Claudel-Hobson carburettor, which, it may be recalled, also played its part in the Transatlantic flight of Capt. Sir John Alcock. Another interesting event recently brought to a close, the 10,000-mile test of a 16 h.p. Sunbeam car running on benzole, provided proof of Claudel-Hobson efficiency and economy, an average mileage of 24.57 miles per gallon being obtained.

THAT capital road-lovers' quarterly published by Messrs. Heath-Robinson and Birch, Ltd., called "Out and Away," introduced itself to us three months ago, with so fine a first number that wisecracks said, "Humph! this is too good to last!" They were wrong. The second issue is a material improvement upon the first, and whether one most likes fine writing or fine drawing, the lore of the highway or the quaint conceits of leading humorous artists, "Out and Away" will please. It is really a splendid half-crown's-worth.

**If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages liii, liv, lv and lvi).**

## COMPANY MATTERS

Aircraft Manufacturing Co., Ltd.

PRESIDING at the general meeting of the company on December 9, Mr. G. Holt Thomas, chairman, in the course of his speech said "The attention of the directors has naturally been devoted for a long time past to the consideration of filling our large factories with "post-War products," whilst maintaining to its fullest extent the Aircraft Design and Experimental Departments, which we have created in the interests of the nation. With this object in view, a long time ago, we sent experts to America to study the mass production of motor bodies, and now our main factories at Hendon are being reorganised in order to cope with the great demand for motor bodies on standardised lines. From the orders and inquiries in hand we do not anticipate any difficulty in entirely filling our factories.

"It has now been decided to capitalise our large reserves and rearrange the capital of the company in such a way as to bring in the new working capital, which will enable the company to proceed with its post-War work, and at the same time maintain its reputation, which is world-wide, in aircraft design. The method of procedure is now having the consideration of the directors, and will probably take the form of an increase of the ordinary shares of the company, in which case the preference shareholders will be given an opportunity to participate."

After the formal passing of the accounts, which showed, after allowing for taxation, including excess profits duties, a net profit for the year of £119,652, and after declaration of the dividend, a balance of £207,680 to be carried forward to next year, the meeting terminated with a vote of thanks to the directors and staff.

## AERONAUTICAL SPECIFICATIONS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m = motors

### APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 18, 1919

- 12,791. A. H. RYAN. Rotary motors. (135,229.)  
13,600. R. F. S. VALERI. Manufacture of ply-wood screw propellers. (135,231.)  
17,062. E. R. CATHROP. Parachutes. (135,245.)  
18,580. BLACKBURN AEROPLANE AND MOTOR CO. and D. T. MORGAN. Rudder bars. (135,254.)  
18,758. W. H. TRIPP and W. D. McLAREN. I.C. engines for aircraft. (135,263.)  
18,826. W. H. HENDERSON. Automatic control of aircraft by gyroscopes. (135,267.)

### APPLIED FOR IN 1919

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published December 11, 1919

- 7,306. W. D. ODDY. Propellers. (135,104.)  
10,704. BLACKBURN AEROPLANE AND MOTOR CO. and R. BLACKBURN. Silencing devices for aircraft engines. (135,119.)

## NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

## FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.  
Telegraphic address: Truditur, Westcent, London.  
Telephone: Gerrard 1828.

## SUBSCRIPTION RATES

"FLIGHT" will be forwarded, post free, at the following rates:—

UNITED KINGDOM			ABROAD*		
	s.	d.		s.	d.
3 Months, Post Free..	7	1	3 Months, Post Free..	8	3
6 " " " " " "	14	1	6 " " " " " "	16	6
12 " " " " " "	28	2	12 " " " " " "	33	0

These rates are subject to any alteration found necessary under War conditions.

\* European subscriptions must be remitted in British currency.

Cheques and Post Office Orders should be made payable to the Proprietors of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, and crossed London County and Westminster Bank, otherwise no responsibility will be accepted.

Should any difficulty be experienced in procuring "FLIGHT" from local news-vendors, intending readers can obtain each issue direct from the Publishing Office, by forwarding remittance as above.